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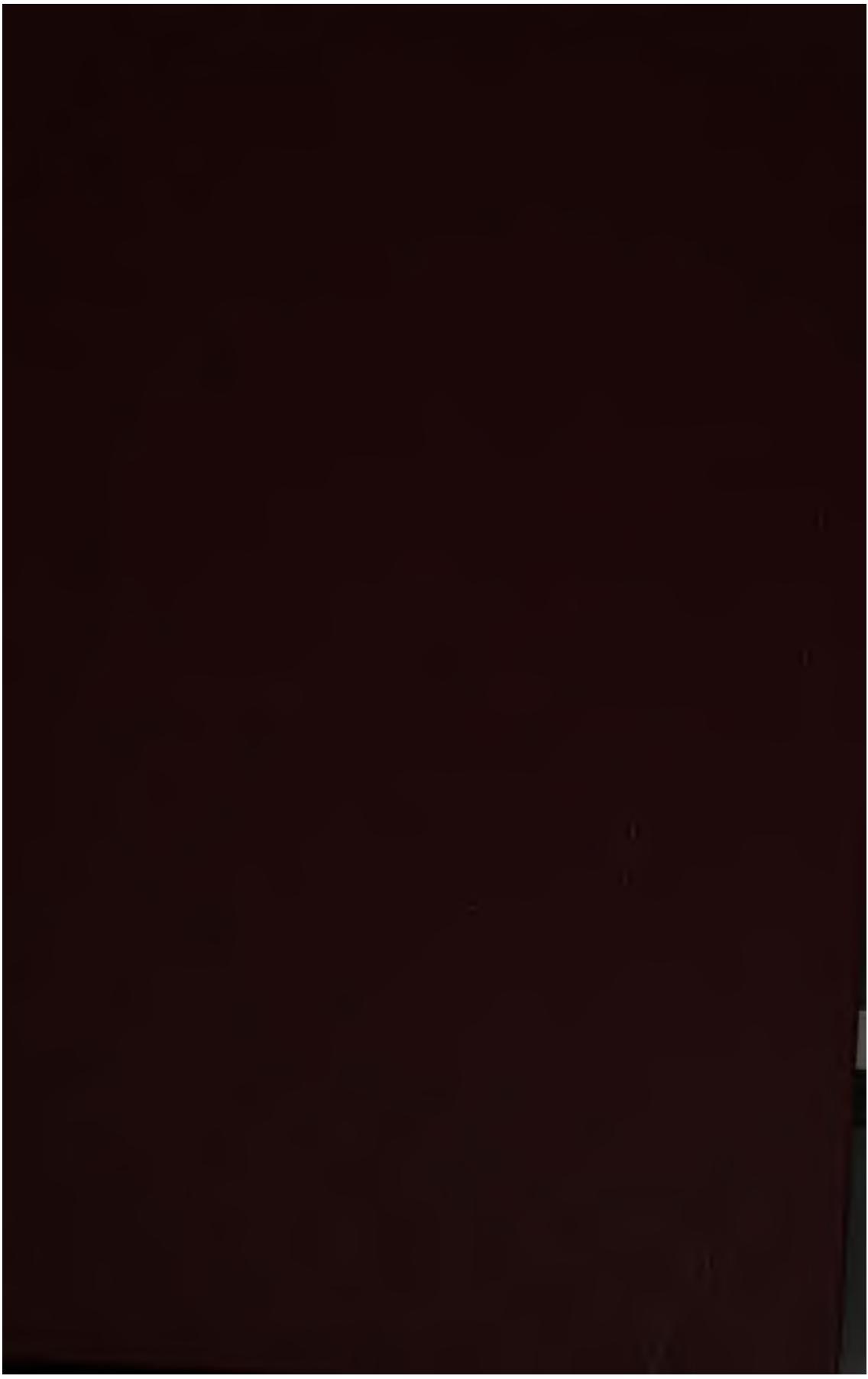

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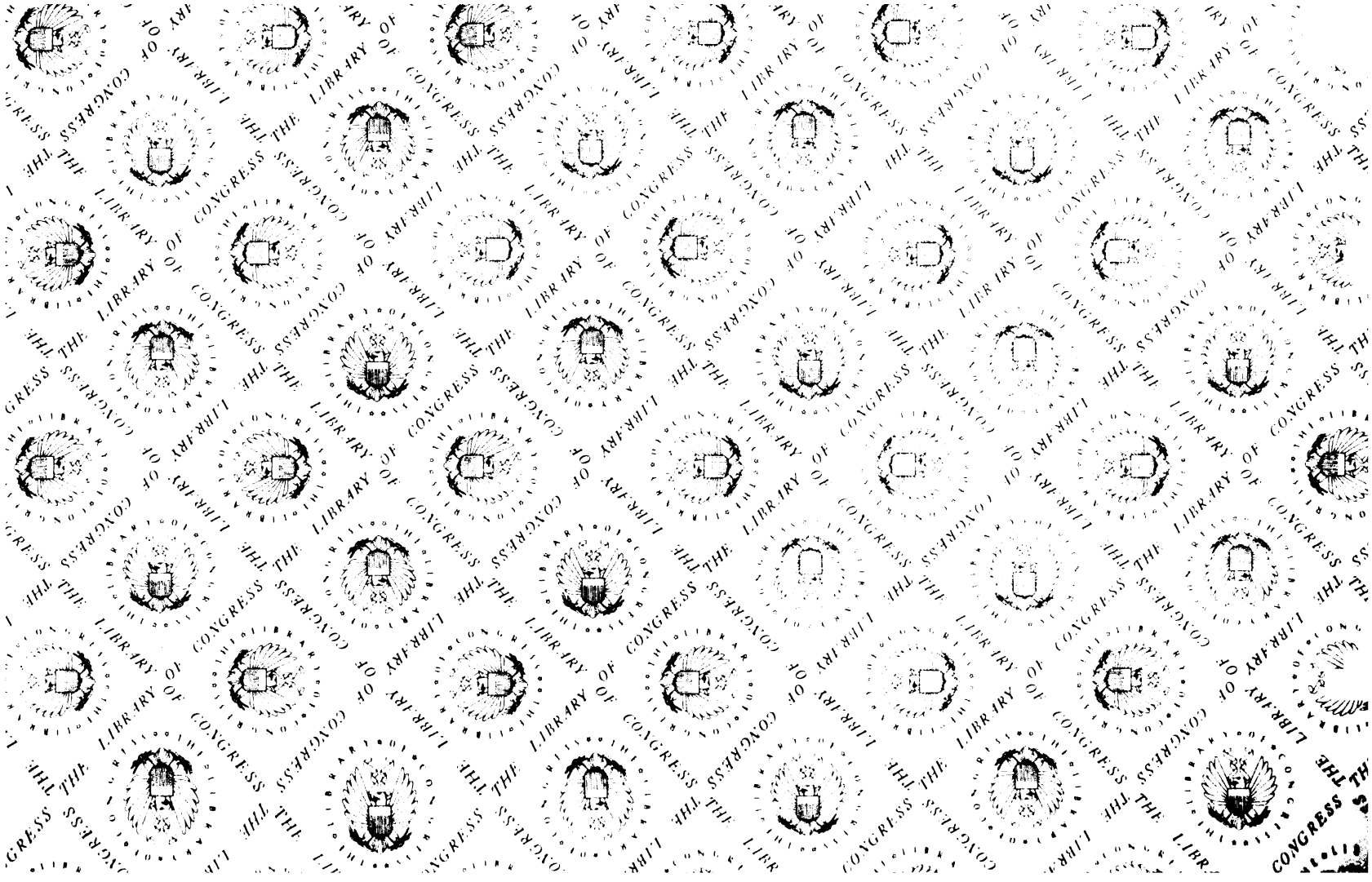
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THE

COUNTRY GENTLEMAN'S MAGAZINE

WITH ONE HUNDRED AND NINE ENGRAVINGS

VOL VI

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HORÆ SYLVANÆ.

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THE

COUNTRY GENTLEMAN'S MAGAZINE

JANUARY 1871

IRISH LANDLORDS AND TENANTS.

THE Ballymena tenants, we rejoice to note, have come to some very sensible resolutions. They recognize the fact that the Parliament of the United Kingdom has done all that it is possible to do for them. The members of the Imperial Legislature, after much anxious and patient investigation, elaborated a Bill in which essential justice is done to both landlord and tenant. The details may not be so perfect and harmonious as the wheels of a watch, but the general principle is righteous. The Ballymena tenants have accepted the Act in this spirit. They see that the Government has done all that it could, and that the remedy against the rapacity of individual landlords, if it exists, is not a matter (to alter a familiar quotation) that

"Parliament can cause or cure."

The Ballymena farmers recognize—or appear to do so from their action—that they are placed by the late Act on the same footing as farmers in England and Scotland, and that if wrong is now done to them, as it is not infrequently across the narrow sea which does but

"Join the regions it divides,"

they must adopt the same means to protect themselves from injustice that are practicable, and accepted as the only legitimate means on this side of the Irish Channel. As tenant-farmers they must meet and consider when an alleged grievance is done, whether it really be an outrage or not on the part of the proprietor, or those in his employ. If it be adjudicated that wrong has been perpetrated, then let representations be made to the landlord that harm resulted to the renter or renters of his land; and we doubt not that fair redress will be given ungrudgingly. The Act provides for it, and Irish landlords, we have faith, will walk up to its provisions. Upon this fact do we pin our belief—viz., that few of the proprietors offered opposition to the passing of the Bill through Parliament—that most landlords in Ireland, indeed, afforded it a hearty support. They had every reason to do so. The tenure of their lives was held upon a much less secure lease than their lands if they asked for their own, and when not obtaining it were forced, often reluctantly, for the good of their own purses and the common-weal, to proceed to eviction. What other course could be towards a man who would neither work his land, nor pay his rent, nor make way for another?

It must be admitted, however, that these forced removals were sometimes—we believe in most instances without the cognizance of the landlords—conducted harshly. The evicted, smarting under their supposed or real injuries, retaliated in a way that outraged all humanity, save that peculiar wild "sport" of it, to use a horticultural phrase, which belongs alone to Ireland. They resorted to *murder*, and the worst feature in

these agrarian crimes was the fact that the criminals were sheltered by the population.

We regret to see that since the adjustment of the Irish Land question by Parliament, agrarian outrage and murder go on; and the Ballymena tenants, if they are good and true men, will band themselves together to prevent such scandals on civilization, such cowardly barbarity and wickedness, as shooting an unsuspecting man from behind a hedge or a wall, from ever again occurring within their district.

Their new Association, which has been christened the Tenants' Protection Society, has for its objects:—

"1. To teach the tenant-farmers that their safety lies in their union, and to enrol them in a mutually defensive league. 2. To watch the operations of the new law, and learn from them what protection of their just rights tenant-farmers are warranted to expect from it. 3. To diffuse information among the tenants respecting those provisions of the Act that specially affect their interests. 4. To help by advice, by directing the legal proceedings, and, if need be, by sharing their expense, any member of the Society, who may be threatened with eviction, with undue increase of rent, or other agrarian imposition.

Let the Ballymena tenants instil into their neighbours the fact which, in the above rules, they appear to recognize, that legal proceedings, not lynch law—the pen, not the pike, should be the arbitrators in cases of dispute between landlord and tenant. And thus doing honour to themselves, they will bring credit and prosperity to their country.

THE POSITION OF THE TENANT FARMER.

By Mr H. Frampton.*

IMPEDIMENTS TO AGRICULTURE.

LET us consider what are the principal impediments or hindrances to a full development of the agricultural resources of this country. I take the following to be amongst them:—1. Insecurity of tenure. 2. Absence of a just and equitable system of tenant right, which would include compensation for all unexhausted improvements. 3. Illiberal and unnecessarily restrictive covenants. 4. Undue burdens upon land in shape of rent, labour, and taxation (including rates). 5. Over-preservation of game and rabbits. 6. Insufficiency of cottage accommodation and suitable farm buildings. 7. Competition with all the world upon an unfair basis. 8. Insufficiency of capital. 9. An unjust and inequitable payment of wages.

INSECURITY OF TENURE.

"Insecurity of tenure." By it I mean liability to be turned out at any time, either from the death of the landlord, the tenant's death, or any other cause; in the second event would be included the widow's (if any) liability. It is evident to all that this insecurity acts as a great check to the application of capital to the soil, unless there is some redeeming feature, and that all who study their own interest will not invest more capital than is really necessary on the land; consequently, it is not so productive, and there is not the return there might and ought to be. This difficulty is best met, in my opinion, by a good lease, or by "a just and equitable system of tenant right, which would include compensation for all unexhausted improvements." Then capital may be invested in land with far more safety than otherwise, and surely it is the bounden duty of the farmer, who has others dependent on him, to see that his capital is invested with security.

RESTRICTIVE COVENANTS.

The next point I consider a great hindrance to the farmer, viz., "Illiberal and unnecessarily restrictive covenants." As the interest of both landlord and tenant ought to be one

* Paper read before the Newberry Farmers' Club.

and the same, so I cannot but believe these are disadvantageous to both, and that it would be to their mutual interest to abolish them. With the necessary restrictions and conditions at the end of a term, what else is required, excepting that the land shall be farmed according to the rules of good husbandry? I feel satisfied landlords would be no losers, but rather gainers, as land would generally be farmed well and left in far better condition than it is now. What a fallacy is that now existing in so many covenants—"and will not sell hay," "and will not sell straw," &c., when the manurial refuse of either of these is, I believe, about 30s. per ton, whereas that of either malt dust, or cake, or beans, is about 75s.; a benefit of something like 150 per cent. to the land! Why, if he were allowed to sell such by bringing back an equivalent (which he would be compelled in self-interest to do), the land would be trebly benefited. Again, look at that absurd restriction "and shall not seed vetches;" why, if that is carried out, the tenant will seed peas, beans, or something else instead, and often much to the detriment of the land; for many a farmer plants an extra field of vetches on land in good trim, to feed in case he should be short of keep, and if not to seed, and more often it is fed than not; there are many such-like unnecessary and useless restrictions; the time is come for such to be swept away.

HIGH RENTS, LOCAL TAXATION, AND GAME.

It is generally acknowledged that land is now let at more than its value in many instances, and why is it? Simply because the demand is greater than the supply. We cannot much wonder, under such circumstances, at landlords requiring a high rent; still, if they know the value of their land, I question the policy of fixing the rental at more than it is worth. Labour, with the farmer, is an ever-increasing item that cannot be stemmed, neither is it the wish of employers to beat down labour, provided they can get "a fair day's work for a fair day's pay;" but as a rule they cannot. Labour is, to a great extent, "eye service," and therefore very dear. This is partly accounted for, I believe, by the unsatisfactory system in vogue of paying men by the day or week, instead of what they are worth. There is another light whereby we may look on this labour question, namely, if the employer has to pay 75 per cent. in rent and taxation, there can be only 25 per cent. left for the labour. I don't mean that these figures represent the exact case, but only use them as a similitude. Now for our friend "Taxation,"—taxation of all kinds, local to mind and pocket! Year after year increasing, and most likely continuing to do so. I cannot wonder at our poor-rate increasing, for if we are not "educating" people to be paupers, I know little about it. Burdened as land already is, yet additional burdens are now threatened; a considerable education-rate stares us in the face, and how is it to be paid is probably a question with many. I do not object to all fair legitimate taxation, provided all stand upon a fair footing, and all property is made to bear its fair share in the taxation of the country; but, alas! it does not. I hope the time, through the efforts of Sir Massey Lopes and others, is not far distant when it may be made to do so. While on this subject, I cannot help remarking on what I consider to be a most unjust thing in connexion with taxation, namely, the bearing of all game prosecutions, commitments, and maintenance by the country. Gentlemen who preserve game can afford to protect it in every way. If a poor man loses his pig or what not, he must bear all expenses attending the prosecution; surely this is not justice. The police are also now, to a certain extent, gamekeepers. By the over-preservation of game and rabbits, temptation is placed in the way of the poacher at the expense of the rate-payers. No man ought to take a game farm with the idea of making a profit, for, whatever the rental, it cannot be cheap. Many a broken spirit, and many a ruined family now mourn the effects of it; people do not know what it is till they try it. What bitter feelings has it raised and engendered, and what evils has it been productive of! Let gentlemen preserve their game by all means, if they please, but let them bear all the expense of preserving and maintaining it.

LACK OF COTTAGE AND FARM ACCOMMODATION.

There is an insufficiency of cottage accommodation and of suitable farm buildings. That these are very important requisites to the farmers, and that there is a great lack of them, none, I think, will deny; even landlords themselves admit it, but unfortunately, in many instances, there it ends. As a rule, feeling the great and absolute necessity there is for both cottages and good suitable buildings on a farm, tenants will generally, I think, be found willing to meet their landlords in this matter, and pay a fair per centage upon all capital judiciously expended in these improvements. To carry on a farm both profitably and comfortably, some cottages are an absolute necessity; where there is an insufficiency, greater recourse must be had to the hiring or "cot" system, by which I mean the collecting together of single servants—young men and boys—into a single cottage; this is not a satisfactory system, and the bringing together of several young heads, without much control or supervision, is often productive of evil; if most are steady and respectable, too often there is a "scabby sheep" among the flock, and then we can imagine the effects of his influence upon the others.

UNFAIR COMPETITION AND LACK OF CAPITAL.

"Competition with all the world upon an unfair basis." This does not require many words from me. I do not object to free-trade in the least, provided it is free. Till the malt-tax is repealed, this will not be; no country can compete with Great Britain in barley, yet here is one of our great cereal productions hampered with an Excise restriction of about 70 per cent. The last one shilling duty has been taken off foreign corn, so that now the foreigner can compete with us who maintain the revenue, without paying one farthing towards it, and not only that, but he also draws a considerable amount from our coffers for foreign lands—very probably a portion of it is returned expended in the manufactured productions of their country. "Insufficiency of capital," and consequently not master of his position, is an injury to the farmer. The sound and idea of a large tract of land for little money is perhaps rather tempting, but as a rule that is the land that requires capital; it is not sufficiently good in itself, and too much has been taken out of it to yield any quick or fair return. How many a farmer finds this to his cost, and wishes that he had taken only so much land as he could well manage! If many farmers would employ the capital they now do, upon considerably less land, would they not be gainers? As at present, they are compelled to go on, and are never in a position to take advantage of the markets and times. On an estate known to most of us, this is more and more apparent. Tenants come and take a large tract of land with little capital, they find they are deceived, get what they can out of the land, and "hook it," each one leaving it poorer than before, and being in that plight himself. Continual changes occur. I venture to say that if the owner would grant liberal and unrestrictive leases at a fair rent, keep down the game, and make it worth a good tenant's while to stop, he would ultimately be a great gainer.

EQUITABLE PAYMENT OF WAGES.

By this I mean a system of paying men according to their worth, thereby causing and arousing a spirit of emulation and striving in them. Our present system does just the reverse, and tends to drag all downwards. A good labourer is always worth his hire to the employer; but how dear is a bad one! I cannot but think we make a rod to our own backs in the way we now pay our labourers. How is it to be altered, I cannot see. Individually we cannot do it; collectively, it is a great undertaking. Labour is very costly to the farmer, and to make it profitable we want it good. I am inclined to think we are not sufficiently well educated in the scientific part of agriculture for us to reap the full advantage. If such, then, are some of the hindrances and drawbacks to a full development of the agricultural revenues of this country, the remedies lie in the opposite direction, or correcting of those hindrances.

Let the landlords look out for enterprising tenants, with sufficient capital at command for the land they wish to occupy; and having secured them, grant liberal leases, with no unnecessary restrictions, at a fair rental. I say leases, because I do not think anything else can take their place, for these reasons:—Every man is but man, death or other changes may take place at any time. If a good tenant enters upon a farm, he does so with the intention of remaining there for some years, and therefore it is necessary that he should not fear any change that may occur, but may lay out his capital upon the land without risk, if judiciously applied. In these cases, when a tenant or his ancestor has been renting the same farm for many years, and may rest in security of justice being done, or when leases have run out and a good understanding between landlord and tenant has arisen, leases may not be a necessity, they are rather supplemental cases; but in all general cases, leases, if properly managed on both sides, are, I believe, a mutual advantage. After granting fair and liberal leases, landlords must be prepared to erect all necessary good farm buildings and requisite cottages, upon such terms as shall be agreed upon. I am inclined to think if all farms were let at a round sum, exclusive of rates and taxes (except assessed and income), it would work advantageously to all parties. In the "Agricultural Labourer" I find the following quotation from Professor Buckman:—"Suppose a landlord has money in the funds, and takes £1000 out to improve his cottage property; he pays no poor-rate so long as it remains in the funds, but as soon as he invests it in cottages, the poor-rates are 10 to 12 per cent. But if poor-rates are properly arranged, so that all property should bear its fair proportion, 2½ to 3½ per cent., instead of 12, would cover the whole;" and he goes on to say, speaking of improved cottages, "This improvement would lower the rates considerably; there would be less sickness, less illness, fewer illegitimate children, less unpleasant concomitants with reference to our parishes."

THE TENANT FARMER.

Having thus passed in review some of the hindrances, with the remedies connected with British agriculture, let us proceed to consider what is of no less interest to ourselves, viz.,—"What is the present position of the tenant farmer?" I think it will not require a deal of beating about or tacking to windward to get at his real position, neither need I dwell long upon it. By position, I mean in a pecuniary sense; in short, has farming latterly been a profitable occupation? To take the last ten years, from June 1860 till 1870, has the tilling of the soil been a profitable business? I say not. I venture to assert that if every occupier of land of these surrounding counties had kept a fair and correct balance sheet for each year, and if every such balance sheet were brought together and a general average for the ten years taken, that there would not be upon the whole capital employed a profit of, shall I say—10 per cent. or 5? I will go still lower, and say 2½ per cent. If this is thought to be a wild assertion, I hope I shall be corrected. I refer not to my own or any individual cases, but to the whole surrounding district as stated. Is there, then, sufficient inducement in this respect to enter upon it? Decidedly not. If a diligent frugal man spends the prime of his like for such a return, is he doing what he ought? I think not; he certainly ought to make a return of at least 10 per cent. Lover as I am of agriculture, it will be my endeavour to persuade those with whom I have influence not to embark in it, unless a brighter prospect appears. I do not mean to say that each or any individual has only made 2½ per cent. There have, of course, been variations as in every case; some few have doubtless made more, and some a great deal less. In the above calculation or advancement, let it be understood I do not include housekeeping or any private expenses, but merely the outgoings and incomings on the farm. It would be well for those who fancy such great things for agriculture to bear in mind what influence untoward weather of all kinds has upon the.

farmer: his men must be paid anyhow, his flocks and herds must be kept and fed, if at a loss, his crops are all exposed to the extremes of weather, either wet, cold, or drought, blight, and such like, and many other things unseen and unthought of by those not engaged in it. Weather and seasons must have a great influence for weal or for woe upon the farmer. If such, then, is a true description of the present position of "British Agriculture and the Tenant Farmer," many may be disposed to look upon it as a hopeless case, but no, it is not so. Remove the obstructions now unfairly existing upon land; let all property bear its fair share of the burdens of the country, place agriculture upon a fair and satisfactory footing, and I imagine I foresee a bright future yet in store. Agriculture is not yet fully developed—see the advancement made in late years. What with the aid of steam and the enterprizing spirit of the age, I believe much more may be done than ever yet has been. A vast amount of capital is ready even now to be expended in all permanent improvements, and only waiting to be called for, and as fast as all drawbacks and impediments are removed, so fast will increased capital be brought to bear, and increased productiveness be the result.

FAILURE IN FARMING.

SUCCESS in farming can be obtained only in the way that brings fortune to people who engage in other pursuits. Hard times and ill-luck do follow some men, we believe—men who, conscientiously trying all they know to succeed, yet fail; but in the great majority of cases, failure is less due to the inscrutability of fate, than to causes which lie unveiled to the eyes of all people who can see.

Let us look at the matter from the farming point of view. How many have we known in the history of this Journal who, entering with a flourish of trumpets on what they considered the high road to affluence, found in a few short years that the path conducted only to destruction. And the Fates were blamed for the bitter end. But why the Fates? These much maligned entities, or non-entities, had nothing to do with the matter at all. The fault lay alone with those who were the sufferers. They brought their misfortune upon themselves. The *facilis est descensus Averni* was accomplished by them without any extraneous assistance. In this way, that, knowing nothing whatever about farming, and thinking it a kind of easy-going, ropy sort of life, they offered more for the land than it was worth. *There* was a heavy per centage upon their ignorance to start with, the landlord, of course, getting the advantage; and the men who really knew their business, and consequently offered only a fair sum, suffered. Starting without knowledge of agriculture, such men as we are speaking of almost naturally pursued, when they got a farm, the same course of extravagance that characterized their proceedings upon entering. We are certainly no advocates for starving land; precisely the opposite, as we well know that Mother Earth, bountifully treated, will repay the giver a hundred-fold. But no more than human beings does the earth care to be surfeited, or to have food thrust upon her at a wrong time. She is as nice in the feeding department as we can possibly be ourselves, and at once rejects what is unsuitable; or, what is the same thing, shews her inappreciation of the food unmistakably in diminished crops. The application of lime, of guano of any kind, of natural or artificial manures, requires to be timed to soil, climate, and season; and this is what many amateur farmers could not understand, and so they lavished their coin, and cursed their

stars at the doleful result. But the whole secret of the matter is simply that they did not know their business.

Another prime cause of failure in farming is the want of capital. We agree with Mr Mechi that the land might be made to yield a larger amount of increase than it now does, if more money per acre was expended upon it in a judicious manner. To spend money well upon a farm, a man must know his business, or else, as we have seen above, failure must be the *finale*. There is no avoiding it. A lack of capital implies the impossibility of buying in the cheapest market; and if you cannot purchase cheaply, you cannot sell to the satisfaction of your customers and yourself. There are no two ways about it. If you take a farm of 400 acres, when you have only capital to stock properly one half the size, you are in the same position as a man who takes a large shop, and who has not the means to put saleable articles upon his shelves. You may cover the nakedness of the land with "dummies," fair enough outwardly to the eye, but "dummies" don't sell. Just so will the large number of acres be unproductive if you leave them vacant of contents. By this we mean, that if you do not manure and cultivate these acres properly, you will not get the produce out of them that they are capable of giving forth. A little money in farming is as dangerous, as, in literature, a little learning is. Plough deep, or never touch—the well, the quotation is known to most of our readers, who will readily agree with us, that this year they would have liked to have touched a spring of any kind from which water would flow.

The rules that ensure success in farming are well set forth in the *Toronto Monetary and Commercial Times*, although our contemporary, of course, as its name indicates, is wholly in the trading line. The *Toronto Times*, having disposed of the people who know nothing about their business, says that the first question one should ask, is "Have I sufficient capital?" "Hundreds," and here we are perfectly at one with the transatlantic paper, "are ruined annually from want of sufficient capital. The number of failures in the mercantile line from inadequate capital is very large. Hundreds rush into business without calmly and dispassionately considering whether they have money or credit enough to carry it on. It may be that they do a good business, but the first heavy payment upon their stock cramps them, and then begins that desperate struggle which too often ends in the loss of whatever they invested. So it is often with mechanical and manufacturing ventures. Before the business is in full operation, in many cases the proprietor's capital is consumed, and he is unable to conduct it with energy and enterprize necessary to success. To 'go it blind' (to use a common phrase), is to court disaster.

"Having sufficient practical knowledge of your business, and a sufficiency of capital or credit to carry it on, the next point to consider is, where shall you commence operations? This is an important condition of success, and calls for the exercise of careful judgment. [How seldom this is exercised in the taking of farms!] Honesty, enterprize, and application—these are three essentials in conducting business properly. 'Honesty is the best policy.' By double dealing and misrepresentations a transient success may sometimes be achieved; but in nine cases out of ten it is as evanescent as the morning dew. Let a man be candid, straightforward, and truthful, and he will stand better with his fellowmen. His enterprize should display itself in keeping constantly the best articles, the newest styles, and latest improvements, and by always endeavouring to keep pace with the spirit of the times. To supply his customers' wants better, quicker, and cheaper than his neighbours, should be his unceasing study. Nor should he keep his light hidden under a bushel. A little printer's ink is a good thing, occasionally. If you have a first-rate article, or a cheap one, which the public require, let them know where they can purchase it. Make no absurd statements about selling 'twenty per cent. below cost,' but simply announce the truth, and you will find a moderate sum spent in advertising a good investment. And with those conditions there must be close applica-

tion to business. Stocks must be carefully purchased, your books always in thorough order, your daily sales and profits constantly jotted down, and your credits limited to those who are perfectly solvent. The head of a business should constantly overlook all its departments, and make sure that none of its wheels need greasing. And last, but not least, the man of business should be economical without meanness, and affable without being undignified." Upon similar principles only can farming be conducted to a successful issue.

CAPITAL IN AGRICULTURE.

BY MR D. LONG.*

THE causes calculated to prevent the investment of capital in agriculture are these:—1st, The law of preference, or the prior right of the landlord to seize for rent; 2d, The constant increase of local rates and taxes; 3d, The Game-laws, and over-preservation of game; and 4th Insecurity of tenure.

LAW OF PREFERENCE.

And, first, as to the law of preference. It is manifest that when, as the law stands at present, the landlord has priority over other creditors for rent, a tenant with insufficient capital to develop fully the productive power of his farm is, in the eyes of many landlords, an equally eligible tenant with a man of ample capital, more especially if, as is generally the case, he be willing to pay a higher rent than a better class of tenant; provided only that the value of the tenant's farming stock be sufficient, in case of an emergency, to secure the full payment of the rent to the landlord. This unsatisfactory state of the law unfairly increases the competition for the occupation of land, and is often productive of great mischief in decreasing the fertility and cleanliness, and reducing the productive power of the soil; and I think that if landlords were obliged to share the assets of insolvent tenants equally with other creditors, they would naturally become more anxious to find tenants of good standing and with sufficient capital, the speedy consequence of which would be a fuller development of the productive capabilities of the soil, owing to the introduction of the larger capital of the improved class of tenants.

LOCAL TAXES.

Secondly, as to the increase of local taxes. The great and continual increase of local taxes discourages the application of capital to agriculture, so long as that capital, if otherwise employed, is not subjected to them. And, moreover, we are further threatened with an additional increase and discouragement for the purposes of education, which, like many other burdens to which personal property does not contribute, certainly must be a National obligation, and the cost of it should not be borne by real property alone.

GAME-LAWS.

I now come to the third part of my subject—the Game-laws and over preservation of game. I am of opinion that the Game-laws, as they at present exist, tend more than anything else to excite feelings of jealousy and distrust between landlord and tenant, and to diminish those feelings of friendship and cordiality which ought to exist between all classes, and more especially between the owners and cultivators of the soil; and I think that these special laws with regard to the preservation of game are an anomaly, which requires the immediate attention of the Legislature, with a view to their entire repeal and the substitution of an effective law of trespass. With regard to the over-preservation of game, I would ask why should a landlord take a tenant as occupier and receive the absolute value of the land annually in the shape of rent, and then, through the medium of his gamekeeper, stock the same land and consume the produce grown on it, by, and at the expense of, the tenant, with game reserved for his own exclusive use and enjoyment? This is the case in the neighbourhood of Gloucester to some extent, and in many places in this county; and I say it is high time that such an unsatisfactory state of things should cease, and that all game should be made the property of the occupier of the

*Paper read before the Gloucester Chamber of Agriculture.

which it is kept. Landlords who pre-
me and reserve the right of shooting,
:e especially those who let this right,
be compelled to contribute to the rates
:s in respect of the annual value of such
shooting. The custom of letting the
of estates to strangers, who, having paid
ight, naturally think themselves entitled
se and enjoy it to the utmost, and who
inducement to conciliate and obtain the
of the tenants, is, I think, one of the
f careless and ineffective cultivation of

This custom often has a kind of de-
ng effect on the tenantry, and, though
: may have a legal right to do this, they
) feel themselves under a strong moral
in not to give power to strangers thus
ge, discourage, and annoy their tenants.
ords are desirous of preserving their
hy do they not keep land in their own
on for that purpose? They might then
and fairly preserve as much as they
since the benefit and enjoyment they
:rive from the game would be counter-
l by a corresponding diminution of in-
come, or deficiency in their own crops, instead of, as at present, in the crops of their unfortunate tenants.

INSECURITY OF TENURE.

I now come to the fourth and last division of my subject—insecurity of tenure. And this is a very difficult subject to deal with. A lease is undoubtedly the most desirable and best safeguard to the tenant, and offers the greatest inducement to increased exertion and more liberal employment of capital. But, setting aside the question of leasing, I am of opinion that if all tenants, whether holding from year to year or otherwise, were provided by our law with as ample powers and facilities for recovering the value of their permanent and unexhausted improvements on quitting their farms, as landlords now have for recovering damages in cases of breach of covenant and dilapidation, this would go far to obviate the difficulty, inasmuch as it would induce occupiers without leases to develop the capabilities of their land by the introduction of the greater capital, and would prevent unscrupulous landlords from robbing their tenants of the capital thus introduced.

LABOUR—LONG-SERVITUDE REWARDS.

VING long been of opinion that "long-servitude rewards" are more ntal than commendable, we were see Mr Aveling refer to the subject nanner he did at the annual dinner of ersham Farmers' Society. It requires tle courage to declare boldly that the f premiums to persons who remain one place, is not only *not* a virtue, lly—a waste of money that might be geously applied otherwise. We admire ling for having displayed that courage, expressing it in a way that appears to ried conviction to his audience, for l reporter tells us the remarks were with loud applause.

at! object to a man who has been r forty years in one place being rewarded with a medal, or a sove- r a whip, or a smock-frock! How be so callous as to disparage and discourage such gifts? You ought to be ashamed of doing so!"

Mr Aveling explains very clearly why he should not be ashamed for decrying the practice of rewarding old servants in this way, but why others should not feel chagrined at the thing being done.

There are just two ways of looking at this "long-servitude." Either the labourer has no energy and no ambition to better himself, in which case it is probable the long service is more attributable to the indulgence of his master than his own merits; or else he is one who, feeling himself tolerably comfortable, and hating change, is taken advantage of by his employer, who does not recognize his faithful work as it deserves. A master should blush to see a life-long service to him rewarded by paltry presents from any association. It may be urged that the recipients of these favours like them so

awarded; that they desire to appear before their fellow-labourers in the character of "good boys."

> "Alas, for man!
> Unless his fellows can behold his deeds,
> He cares not to be great."

Mr Aveling does not wish to encourage such a feeling. He desires the man to know that he is worth something, and to take advantage of his knowledge; and the master, if he properly recognizes the value of those under him, to make it worth their while to remain in his service; in which case there need not be any patting on the back by outsiders.

For skilled labour, rather than for long labour—for labour (if we may be permitted a paradoxical expression) which saves labour—Mr Aveling would be more liberal than societies generally are. It may be said that "labour is its own reward;" and so indeed it is to one who thoroughly knows his work and does it; but such a one, unless he is properly remunerated, is never likely to reap the reward attaching to long service. He will try and get the same pleasure out of his work in the place where he gets most profit. Rightly so; and such men deserve the encouragement of societies like the Faversham, more than those who

> "Ploughing fields from day-to-day,
> View each year's end as one they saw before."

This appears to us to be Mr Aveling's idea, as will be seen from the following extract from his speech:—

Mr Aveling, looking at the prize sheet, confessed himself surprised at the great disparity between the amounts awarded for long servitude and those awarded for skilled labour. He found that under the head of skilled labour, sixteen ploughmen received £16, 11s. 6d., ten shepherds £16, 10s. 6d., five hop-dryers £8, 9s., that fifteen dinners cost £1, 17s. 6d., making in all thirty-one men receiving £43, 8s. 6d. On the other hand, he found that for long servitude, agricultural and commercial labourers received, in thirty-three prizes, a sum of £56, 15s., to which must be added £7, given to four members of benefit societies, £2 to a labourer who had not received parish relief, £4, 15s. for thirty-three dinners, making, in all, a sum of £70, 10s. He thought the time was now come when a little more attention must be paid to skilled labour and not so much to long servitude. He was anxious to see their society a real benefit to the agricultural labourer, and to see its prizes distributed among all the labourers of the district, instead of among the labourers in the service of members of the association. He urged that districts should be defined, and that all the labourers resident in those districts should be eligible for prizes. As to prizes for long servitude and for bringing up children without parish relief, those prizes ought, in his opinion, to be discontinued, as they failed in the principal object for which prizes should be given, namely, to produce results. He objected to rewarding a man for long servitude, because a man's first duty being towards his family, he ought to take his labour to the best market, and because it was the duty of the master to reward the man himself if he considered him deserving of reward. If long servitude was really advantageous to the master, it ought to be secured by an ascending scale of wages rather than by the prizes given by that and similar societies. In his opinion no man ought to be rewarded for working for low wages if he could get higher, or for living in a bad house or an unhealthly place if he could avoid it; nor should he be rewarded for not applying for parish relief if he needed it. There was no merit in a man's abstaining from parish relief if his family had been healthy and his work constant; neither, on the other hand, was there merit in a man's continuing to work always for a good master at good wages, and with a good cottage and garden such as was provided by Lord Sondes for the labourers of his tenants. What credit, he asked, was it to a labourer to remain with such masters under such circumstances, knowing that it was impossible for him to better himself in any other part of the country? And if it were no credit to the man to remain in such service, what ground was there for rewarding him for it? It appeared to him that, in doing so, they were giving prizes to objects that did not deserve them, and misapplying funds which ought to be directed towards raising and improving the skill of the labourer to a higher standard of excellence. If they would do so, they would, he felt sure, be doing more for the good of the labourer, the prosperity of agriculture, and the usefulness of their association, than by awarding such a disproportionate amount of prizes to long servitude. He, in conclusion, hoped that what he had said would be accepted in the same friendly spirit that had prompted it, for he had no personal object to serve, his only desire being to promote the efficiency of the society and the best interest of his agricultural friends. (Loud applause.)

We are hopeful that Mr Aveling's remarks will prove "like bread cast upon the waters," —fruitful.

The Farm.

AGRICULTURAL IMPORTS AND EXPORTS.

IE Trade and Navigation Accounts for the month, and ten months, ended st October, have recently been issued. ing the number of oxen, bulls, and irst, we find that in the month we had :ess of more than 6000 over the corre- ing month of the previous year, and 8000 more than in 1868; but in the period there was a decline in the im- his year of about 30,000, as compared ıe number reaching our shores in 1869, early 40,000 more than in the ten s ending October 1868. The exact :rs received during the respective s of the three years mentioned were ows:—1868, 99,695; 1869, 170,415; 140,431. Of calves the imports in the amounted to 2909, which was 423 than in the same month of the year and upwards of 1800 more than in :r 1868. On the ten months there n increase of 1694 foreign calves, mbers being, for 1870, 28,064; 1869, . Many farmers will rejoice at this r not a few think that by killing our oducing animals at this early stage, re slaying the goose that lays the eggs. We know some farmers who o strong an opinion about the unde- y of slaughtering calves—as wasting tion's food—that they will not touch a of veal. This may be carrying the against the use of the flesh of ani- this period of their being, a little too t it is a failing leaning to virtue's side. e, instead of eating our calves, pre- them in larger proportions to grow to y, it would not have been necessary o have had so much recourse to cattle s from foreign countries; and we not have had that frightful mortality which has prevailed among our stock ever since foreign animals were introduced. We cannot go so far as to say, with some, that our stock would have been free from epidemic disorders had no animal ever crossed the Channel; but we must say the evidence is very clear that disease has been brought in on more than one occasion by importations from abroad, and that, in all probability, had we been less prodigal of our calves years ago, we should never have needed accessory supplies of animal meat from other countries where disease is supposed to be endemic. Neither should we have incurred those losses which made a drain on the National Exchequer, a heavier drain still upon the private purses of considerate landlords, and nearly ruined many an industrious farmer in the Rinderpest years.

Of sheep the imports in the month were upwards of 19,000 more than in October 1869, and 2 5/8th more than in 1868, the numbers being for the latter year 23,390; in 1869, 41,274; and for October this year, 60,433. In the ten months, however, we notice a falling off to the extent of nearly 60,000 head, although the number received was just about double that arriving in 1868. The totals for the ten months in the three years were, 1868, 286,143; 1869, 615,160; 1870, 557,088. There was a great increase of lambs in the month, the total number arriving being 1728 against 93 in October 1869, while in the year prior to that the imports were *nil.* On the ten months, however, the arrivals shewed only about 300 in excess of 1869, being 18,675, as against 18,367. The porcine race were in much larger demand, the number of swine we received, up to the end of October this year, reaching 82,809; last year, at the time stated above, the imports were 55,538.

The war on the Continent, as might have been expected, has made a considerable difference in the imports from those countries directly engaged in the struggle. From Prussia, in October, we received only 62,128 cwt. of wheat, as against 350,106 in the corresponding month of the previous year; but from France, singularly enough, our receipts were only reduced about 6½ thousand cwt. On the ten months the supplies from Prussia have diminished to upwards of 1½ million cwt., and from France, in round numbers, about 140,000 cwt.; but from the latter famishing country we have had five times as much wheat this year as we had in 1868.

The following table shews the exact supplies and the countries whence they were derived :—

Wheat.	Ten Months ended Oct. 1869. cwts.	Ten Months ended Oct. 1870. cwts.
Russia	6,196,646	8,219,154
Denmark	383,250	294,879
Prussia	3,864,486	2,335,302
Schleswig-Holstein, and Lauenburg	42,240	21,536
Mecklenburg	518,869	455,425
Hanse Towns	615,971	273,632
France	410,023	174,651
Illyria, Croatia, and Dalmatia	953,413	45,272
Turkey, Wallachia, and Moldavia	2,270,701	354,765
Egypt	853,615	104,950
United States	9,527,919	10,666,001
Chili	449,468	549,520
British North America	1,556,276	2,212,723
Other Countries	441,971	261,960
Total	28,134,848	25,969,710

It will thus be seen that our imports of wheat this year fell short of those of last by 2,165,138 cwts.; and the value as declared up to the end of September, was this year £11,836,971, as against £12,503,865 in 1869, and £17,807,059 in 1868; that is, we have saved £700,000 this year over last, and nearly £6,000,000 of the expenditure of 1868.

There is not much difference in the supply of barley as compared with the receipts from abroad last year, but a very large increase in oats as the subjoined tabulated statement shews :—

	Cwts.	Cwts.
Barley	6,295,085	6,127,434
Oats	5,264,886	9,005,491
Peas	661,911	1,618,148
Beans	1,475,526	1,218,186
Indian corn	14,192,954	14,400,088

The aggregate value of our bread-stuffs in the nine months was £25,035,006; in 1869, for the same period, £24,129,099, and for 1868, £30,049,986. In the imports of potatoes, a falling off is observed both in the month and ten months. In the latter term, owing to the excellent home crop, the receipts were only 762,836 cwt., as against 1,403,055 in the corresponding period of the previous year.

With regard to imported articles under the general head of provisions, we notice a diminution to the extent of 65,000 cwt. in butter, the quantity brought in this year, so far as the returns are made up, being 909,731 cwt., as against 970,221 last; but of cheese we imported 465,000 cwt. more than in 1869. The import of eggs, although not many from France, are making their appearance in the London markets, has not much diminished, being 388,703,760 to compare with 389,824,560 in the ten months of 1869.

In pork there is a notable increase on the month and during the longer time; but on bacon, hams, and beef, there is a marked decrease.

With a very short supply of hay, a straw crop not up to the average, and a deficiency, in most places, in turnips, it might have been expected that oil-seed cake would have been in more extensive demand than it was last year. The returns, however, do not shew this to be the case. In the month, only 12,545 tons were imported as against 14,935 in the corresponding month of the preceding year, and in the ten months 117,926 tons to compare with 124,793 tons in 1869. This falling off, taken in connexion with an increase in cotton cake in the ten months, of more than 11,000 tons—viz., 102,211, as against 91,195, and in rape of, in round numbers, 184,000 qrs.—306,817 to compare

,995 qrs. in 1869, would seem to in- ıat cotton and rape are being more ı by agriculturists for feeding.

was a great decline in clover seed, the month and ten months; in the :riod the supply was less by more ooo tons. We had received up to of October only about the third of ıtity of hops we did in the same 1869, viz., 74,790 cwt., as against cwt.

regard to manurial substances, we guano was not received to the same ıring the month as it was in October :ar, the quantities being respectively ns and 19,035 tons. In the ten of 1870, the imports nearly doubled the like term of the previous year; thus, 212,255 tons, and 111,184 f bones we had this year 70,485 compare with 73,226 in 1869. The of cubic nitre exceeded by nearly cwts, those of the ten months of last

ı decrease in wool in the month, we ıcrease in the ten, that being solely due to the abundant supplies from Australia. The total quantity received was 233,218,167 lb. (169,194,773 coming from Australia), as against 225,236,880 lb. in the corresponding period of last year. The value of the wool we received in the first three quarters of this year was, £13,071,523, and in 1869, £11,799,292.

Turning to the other side of the account, we find that the export of bacon and hams was greater both in the month and ten months, the sum realized up to the end of October being £113,813, as against £82,691 in the preceding year. Beef and pork made £94,060, in 1869 only £17,178; beer and ale, £1,553,631, to compare with £1,541,072; butter, £246,296 as against £226,884; cheese, respectively, £91,543, and £86,660; and horses, of which the exports doubled during the month owing to the war on the Continent, £182,896, to compare with £119,841. In the value of our imports of home-grown wool there was an immense falling off, the sum realized this year amounting to only £484,061, as against £821,970 last year.

THE SIZE OF FARMS.

By Mr Trask.*

ating of the size of farms, it must be arly understood that I am speaking which are cultivated for the purpose cing the staple food of the commu- l affording at the same time a fair re- the cost of production. We some- ar of very large sums having been ım small plots of land, generally in ɔtional season, and from some par- ticinds of vegetable perhaps, which ppened to be a temporary demand hen; or from the successful raising s; or, it may be, from an extraordi- nary crop of fruit, or other productions of a similar kind. But I need not stop to shew, what must be quite obvious to every one, that the soil of this country cannot be generally applied to the cultivation of a kind of produce for which there is a very limited demand; therefore, in the remarks which I shall make, I shall leave gardens and gardening entirely out of the question, and refer to farms and farming, with a view, as I said before, of producing the staple food of the country, which is, and must always be, the question above all others of the greatest importance to the community at large. In referring to the comparative ad-

* ad before the Central Farmers' Club.

vantages and disadvantages of large and small farms, the systems that prevail in other countries have been invariably referred to as an illustration of what may be done in this country; but the circumstances of different districts of our own country even, vary greatly, much more do the circumstances of different countries vary, in the important elements of soil and climate particularly; and this is a fact that we should be careful to keep in view. Under these circumstances I feel that I should not occupy your time very profitably if I went at any length into a comparison of the state of English as compared with the state of continental agriculture. I shall proceed, therefore, to an examination of the results of the two systems, of large and small farming, which are exemplified under similar advantages, as regards soil and climate in different parts of our own country.

CONDITION OF THE OCCUPIERS OF SMALL FARMS.

I shall now call your attention to the condition of the occupiers of small farms, both as proprietors and as tenants, with the state of the agricultural labourers in large farm districts; and I am happy to find that a great deal of most valuable information has been collected by the Royal Commissioners on the employment of children, young persons, and women in agriculture, which throws considerable light on this part of our subject, and to which I must allude. I will first refer to Mr H. Tremenhere's report on the counties of Cumberland and Westmoreland, where there is a predominance of small farms, and farmed, too, by the owners themselves, known in these counties from time immemorial as statesmen or estatesmen. The Assistant Commissioner says of them, that "excepting on the land of some of the larger proprietors, the farming of the statesmen is generally bad. There is little spirit of improvement in the class. If they possess a little money they prefer hoarding it in their oaken chests to laying it out on the land. "Would you not," was inquired of an old statesman, "expend a shilling on your property if it would eventually return you five shillings?" "No, I would rather button it up in my breeches pocket; it would be safer there," was the reply. The roads leading to their homesteads are generally so bad, that it has been said that the only safe mode of reaching them would be by a balloon. The midden or dung-pile is close to the door of the dwelling-house the land, generally undrained, is prolific of rushes, and the whole appearance of the property denotes poverty, slovenliness, and neglect. Bailey and Culley, when they visited Cumberland early in the present century, were struck with the impoverished condition of the small statesman, and the condemnation then pronounced on their management I have seen nothing to induce me to consider as inapplicable to the present day: "These men," they say, "seem to inherit with the estates of their ancestors their notions of cultivating them, and are almost as much attached to the one as to the other." "I heard," continues the Assistant Commissioner, "of several of the smaller statesmen who, finding it impossible with their limited capital to make a living out of their land, sold it and became tenants of the very farm which, as owners, they had vainly endeavoured to cultivate with profit. In one case, a small statesman, who had become embarrassed, sold his property to a neighbour, who took the estate into his own hands, and employed the former proprietor as his hind; and in a very short time the land, under improved management, was made to yield double its former produce. At best these small proprietors have to struggle hard for a subsistence, and small statesmen of from £50 to £70 a-year are obliged to work harder and longer than any labourer would consent to do for the highest wages that could be offered to him." Mr Tremenhere then goes on to speak of the state of the children of those proprietors; "the effect," he says, "of these small properties on the children of their owners is not favourable, for they are often kept from school for months to assist in the work of the farm. On inquiring of one at what age his children began to assist in the farm work, "as soon as they could crawl," was

y; and I believe I am correct in hat, as a rule, the children of the proprietors feel the disadvantages of cted education through life, and do sper in the world so well as those of ural labourers." And he concludes If it is important that the soil should ivated with the maximum effect, the atesmen of these counties certainly satisfy that desideratum; half shep- half husbandmen, they are deficient pirit and enterprize which agriculture s, and they are without either capital . In the districts where tillage pre- ey are singularly out of place. In heep and dairy farms they have a more ate occupation, and they will probably ong in the secluded mountain dales, a it of that community of small pro- s, whose simple manners and sturdy ndence have long given to this f England one of its most marked teristics." I have not hesitated to give ttract from the reports of the Royal issioners, because the information was ntly collected by the Assistant Com- ier on the spot, and doubtless under sense of the responsibility that was at- to the important office he filled. You t fail to notice that these statesmen of rland and Westmoreland are the pro- s as well as occupiers of the land, the osition that is considered by the ad- s of the small-farm system, to be most ible to its success. But the most con- evidence against the system is the at the number of small holdings is diminishing, and have been con- y diminishing for many years past; small-farm system was at all suc- or advantageous to the community, uite certain that the number of small would increase instead of diminish. e real fact of the matter is, that the sion of small farming does not gene- answer in practice in this country, e occupiers, whether they are the s also, or not, have found it much to their interest to work as ordinary abourers for regular weekly wages, than continue in the occupation of such small farms as those of 10 or 20 acres in extent I might give you abundant evidence of the truth of this statement from all parts of the country; thus, at Burbage, in Wilts, Mr C. G. Bolam, agent to Lord Ailesbury, stated to one of the Assistant Commissioners that "there are a number of small accommodation hold- ings of from 2 or 3 to 20 and 30 acres at Burbage. The land being very rich and pro- ductive, the tenants are enabled to raise good crops at a comparatively small outlay. They pay an accommodation rent for these lands, and make a livelihood by growing vegetables, seed, &c., and making milk and butter for the markets. They are, as a body, almost worse off than many of the labourers; their capital is small; their work very fitful, at times very hard, at others very slack. The result of these intervals of comparative ease is too often the formation of vicious habits, and their want of education and training pre- vents them from profiting by the start beyond the ordinary farm labourer." This view is also confirmed by the vicar of Burbage, Archdeacon Stanton, who says of these men that "he does not think that they are as well off as many who work regularly as day-labourers. If they get an un- usually good crop, they become extrava- gant; they don't save; and suffer from want during the winter when no work is to be had." The Commission found also a universal concurrence of opinion that the state of education among small farmers was even worse than among the ordinary farm labourers. Thus, if we go into Devonshire, we find it stated that "the children in the Union are better educated than many farmers' sons. The will for education is not wanting among the farmers, but they have no capital, and are obliged to keep their lads at home to work on the farm." Again, at Heckfield, in Hants, it is stated "that the children of small farmers are worse off for education than those of labourers." If we turn again to Wales the same features present themselves; thus the Commissioners state that "the system of small farms (of from 10 to 50 acres), in its bearing upon the best interests of the occu-

pier, his children, and the community at large, receives much illustration in the evidence relating to it in Wales. "There can be no doubt," the report continues, "that in Wales, as in England, according to the evidence, the small farmer lives harder, employs his children earlier, and gives them less education than the ordinary agricultural labourer. And in regard to the result of small farms on the produce of the land, the evidence entirely confirms the opinion expressed by Mr Culley in a former report, that it is impossible for agriculture to make any decided advance in a district where the holdings are so small as to make it unprofitable for the occupier to employ the ordinary mechanical aids which increase the produce of the farm at the same time that they lessen the cost of production." The agent to the Earl of Cawdor winds up his evidence by declaring that if the landowners of Wales do not merge their small holdings and make them more attractive to men of capital and enterprize, "the country must remain as at present, very little advanced from a state of nature as regards farming." And Mr Boyle, writing of Monmouthshire, says, "It sounds very well at first, that every labourer should have his own little holding, but it too often ends in his only making use of it to borrow money which he can never repay." Now, I believe the evidence which I have given, and which is only a very small portion of what I have collected, all to the same effect, embodies the opinions of every practical farmer in the kingdom; but I have preferred giving the opinions of those who are prosecuting, under the direction of the State, a most important inquiry on matters relating to the agricultural interest, and who could not possibly have the least bias on this question.

CONDITION OF LABOURERS.

In the large-farm districts, we are met with the fact that a large increase has taken place during the last twenty-five or thirty years in the rate of wages. Thus, in Wiltshire, Messrs Rawlence and Squarey give it as their opinion that the wages of young unmarried men have increased about 40 per cent., and those of older men about 10 or 12: the difference being attributed to the fact that married men are less disposed to move than unmarried men, and are content with a smaller sum as an inducement to remain in one place. If we turn again to another part of the country, we find that Mr Stanhope ascertained, in the northern part of the great wold district of Lincolnshire, where the farms run mostly from 800 to 1000 acres and upwards in extent, that "the work is plentiful and certain, and the wages high, and the labourers having this are not inclined to leave the place." Their wives, he says "are too well off to work." These facts may be allowed to speak for themselves, I think; but as a rule, under our system of large farms, it is beyond doubt the fact, that a good, honest, and industrious labourer seldom or never wants for work at good wages. Before I have done with the state of the labourers, however, I may perhaps mention that, in a letter to me some two or three years ago, Mr J. S. Mill referred to the exorbitant price which the agricultural labourers had to pay for many necessaries of life in country villages, "a thraldom from which," he said, "only co-operative stores could relieve him." I can hardly go into the question of co-operative societies here, and of the difficulties, insuperable I think, which would attend their introduction into agricultural districts; but I may mention the course which has been successfully pursued in this matter by a Wiltshire farmer, who farms between 1500 and 2000 acres of land. He found, when he entered on his farm, that his labourers were paying considerably more than they ought for almost every article of consumption which they required; he therefore determined upon purchasing these things at the wholesale rate himself, and he placed a reliable person to sell it to his workpeople at a price that just cleared the original cost and expenses, and they are highly pleased with the change, which has proved a very great advantage to them; it has no affinity to the truck system, as the labourers are all paid their wages in money, but they are only too glad to get their wants supplied at the reduced price at which they are offered to them.

shop provided by their master. It will
en, therefore, that a remedy for the
tant prices which the agricultural
ers are charged for things in some
ts, can be provided by large farmers
ing the example I have given, which the
farmer could not do. In fact, the small
takes little or no interest in the con-
of the labourers, for he only occasion-
nploys them at all.

ADVANTAGES OF LARGE FARMS.

ere the land is not *naturally* fertile, the
ıce is conclusive, that only by men of
l, or (I must add since the meeting of
oyal Agricultural Society this year at
l) ladies of capital, can such land be suc-
lly farmed. The power which the large
can bring to bear on any of the opera-
of the farm is an immense advantage.
ckleness of the climate, too, in this
y, gives a great advantage to the large
, who, by concentrating his power, can
dvantage of the most favourable oppor-
to perform, in an expeditious manner,
ost important operations in agriculture.
riculturists are aware of the success
has attended the introduction of steam-
as applied to the cultivation of our
ils in different parts of the country,
the latest and most successful ex-
s of which is that of Mr John Prout, at
dgeworth. Now, I hold it to be quite
ible for steam cultivation to be used
sfully under the small-farm system;
believe, no practical man will be found
y. But it is asserted by the advocates
small-farm system, who, it is perhaps
ss to say, are not practical farmers,
machinery may be hired round by co-
ive freeholders with more economy than
loyed only on a single farm." My
r to this is, that while the machinery was
ing about from one farm to another,
king it up and setting it down, the whole
night be done on a large farm by the
who has the machinery and the labour
niently at hand to work it. But I
confess that, in pursuing my inquiries
ıe merits of the two systems of large
and small farming, I much regret that I have been compelled to say so little in favour of the system of small farms. I wish it to be particularly remembered, however, that I have been hitherto treating of the question from its general aspect; but there is no rule without an exception, and I am now about to speak of an exception to the rule. The impossibility of an industrious and thrifty labourer rising to the position of a farmer has been referred to, as against the system of large farms; and I am quite sure that no large farmer can be found who would not be most happy to see the agricultural labourer raise himself to that position, if by doing so he would benefit his condition. But he could not hope to obtain that position unless he had the opportunity of doing so by entering on small farms at the outset.

HOW LABOURERS MAY RISE.

There is, however, the plan of letting plots of land, that is suitable for the purpose, to the most careful and industrious of labouring families, for the purpose of keeping a cow or two, a plan that has answered well in many places, and which I have no hesitation in commending; for, besides the advantage it gives the labourer of improving his position, I know that one or two cows kept properly by themselves will yield more milk than if they were in a herd of forty or fifty cows; and the system, as I just said, has been found to answer very well in practice. But this has not been the case where a man with two or three cows has been tempted to do nothing else: thus, in Derbyshire, Mr Cottingham, agent to the Duke of Devonshire, says that "a man with an allotment of, say 10 acres, to keep a couple of cows, is better off than the holder of 20 or 30 acres, or a farm just big enough to tempt him to do nothing but work on the farm. I reduced one man," he said, "10 acres, from 20, to compel him to work; and he afterwards told me I had made a gentleman of him." I could give a great deal more evidence of a similar character. Of course, in commending this system, I am assuming that the cows are managed by most care-

ful and thrifty persons. To suppose that it would be successfully carried on by the *generality* of our labouring families, would be a very great mistake indeed. But under our *laissez faire*, or non-interference principle, farms of all sizes will not be wanting, and I hold that there is no necessity in this country to depart from this rule, as the question of the size of farms has satisfactorily regulated itself to the present time, according to the requirements of the community.

MODERATE-SIZED FARMS.

You will have observed that I have been hitherto speaking of the two systems of large and small farming; but by far the greater number of tenant-farmers in this country are in the occupation of comparatively small or moderate-sized farms, and it is to these I now wish shortly to direct attention. I have already shewn the great advantage which the large farmer has over the small one in carrying out the different operations of the farm. This advantage he possesses over the moderate-sized farmer, but in a less degree; the one who can afford to employ the best mechanical aids, and having sufficient labourers to properly apportion over the different branches of farming operations, and so to bring the whole into a regular working system, is in the best position to develop to the fullest extent the resources of the soil. But I must not be understood to say that moderate-sized farmers cannot farm successfully; we have abundant evidence that by the exercise of the greatest industry and zeal this is done, yet his position at the present time is most unsatisfactory. But it is not from a lack of mechanical aids, or from any inability to perform in a proper manner the ordinary operations of the farm that the position of farmers occupying comparatively small or moderate-sized farms is rapidly becoming intolerable; it is arising from an excessive competition for land, precisely the same cause that brought the Irish land question to a crisis, and, I believe, will inevitably bring the land question to a crisis in this country also, if nothing is done in time to counteract the evil effects of it.

NECESSITY OF LAND COURTS IN ENGLAND.

I consider the land question in England at the present moment may be fairly represented in this way:—The occupier of a farm of such a size as to require from £8000 to £10,000 of capital to work it, may be said to be, on the whole, in a position to take care of himself, that is to say, there is no necessity at present for the Legislature to interfere in his behalf; the occupier of a farm that requires from £3000 to £5000 of capital, would, from the greater demand there is for such farms, give somewhat more than the real value of it, rather than leave it for the chance of getting another such holding; the occupiers of farms that require but from £1000 to £2000 of capital—these being the most numerous, as I have said, and the class I am now directing your especial attention to—would submit to any extortion almost, rather than leave their farm, as there are thirty or forty applicants, as a rule, for every farm of this size that comes into the market, and a tenant leaving would have but the thirtieth or fortieth part of a chance of getting another such holding. I am assuming, of course, that the land is really useful land and not unduly encumbered with game, or other serious drawback attached to it. Now, this is a state of things which some of the owners of these moderate-sized farms are not slow to take advantage of; in some cases, to my knowledge, the most undue advantage, I am sorry to say, has been taken of the occupiers of these comparatively small-sized farms, solely in consequence of the extreme competition that at present exists for such holdings. But why farms should be of more *real* value, solely because farmers multiply and must live, and farms do not multiply, I am at a loss to understand? In the county of Somerset, where the moderate-sized farms to which I am now referring largely prevail, the competition is something enormous, and we are beginning to hear of the loathsome system of offering bribes to agents to get farms; and in one case, that has recently cropped up, an agent is greatly belied if he didn't accept a bribe of £100 from an in-going tenant, for whom he

farm, and that, too, with the owner's
lge. Judge Longfield, in his Essay
"Land Tenure of Ireland," says that
iest offers for farms "will be generally
y the poorest farmers," and also that
al grievance was that the rent was so
s to reduce the tenant to indolent
ic despair." Now, I fear that on
states in Somersetshire the tenants are
lmost driven to the same state. A
s lately come under my own know-
upon undoubted authority, which I
u will permit me to mention. The
or the solicitor rather, of an estate in
ns, and occupied by five tenants, at a
f over £2500 a-year in the aggregate,
ned to raise the rents again last year:
d been raised about 15 per cent. not
ears before, and the mode of proceed-
pted was this:—A tenant was served on
h of March with a notice to quit at the
lmas following. But he was told that
merely served for the purpose of an
e of rent; but what this increase was to
was not told, nor could he ascertain till
three out of the six months' notice
pired, and the opportunity of taking
farm was lost, when he was informed
ie rise this time was *only* to be
r cent. — and this he was obliged
nit to, or leave. Having no chance of
another suitable farm, he submitted, as
e other four tenants also. But this
e of these five tenants had succeeded
ing another farm; a second has tried
the same; the third has died; the
has been lately taken to a lunatic
; and the fifth declares that he would
nain but for special reasons, which I
ot refer to. All these five tenants have,
old, been in the occupation of their
with their relatives before them, for a
ntury each. The only excuse put for-
r increasing the rents in this case was
essities of the owner; the question of
ue of the farms was not considered at all.
will any one tell me that such acts as
vill tend to the ultimate advantage of
downers in this country? I think not;
Land Courts were to be established
in England (as they are about to be in Ire-
land), where tenants may appeal in cases of
extortion and injustice, I believe it would be
one of the most conservative measures that
could be passed. I am perfectly well aware
that the great proportion of the land in this
country is held by just and generous land-
lords; they have nothing to fear from the
passing into law of an act that shall enforce
throughout the country something like their
own fair and just dealings; but they have every-
thing to fear from extortionate landowners,
or unscrupulous lawyers, who may have
the management of large estates that have,
through losses in the betting-ring probably,
become heavily encumbered. These are the
persons who will bring the land question to
a crisis in this country. Nor is it necessary
that cases of hardship should become gene-
ral before it would be the duty of the Legis-
lature to interfere. His Grace the Duke of
Richmond, in his speech on the second read-
ing of the Irish Land Bill, said, that "In the
case of any body of people, however small,
having injury inflicted upon them, he con-
sidered it to be the duty of Parliament to en-
deavour to find some remedy for it." I con-
sider that it is to the eternal disgrace of the
different Governments of this country that the
people of Ireland had to pass through the
horrors of a famine, and were brought to the
verge of a revolution, before the land question
was honestly taken in hand and justice done
to it; with our Reformed Parliament let us
hope that no Government will be permitted
to exist that will allow it to come to such a
pass in this country before applying a remedy.
I do not for one moment dispute the fact that
landlords have at present the legal right
to exact the utmost farthing of rent that
they possibly can for their land in England;
but I deny the justice or the prudence of
their doing so, for it will inevitably create—
as, indeed, it has already created on many
estates—a discontented body of tenantry.
The competition principle has had the fullest
latitude in Ireland, the custom of payment
for good-will which there prevails being
essentially a commercial transaction, go-
verned by supply and demand; but whether

it is paid in good-will or in the shape of rent, matters nothing. We have seen the result of all this in Ireland, and it needs no prophet to foretell that the same cause, if allowed full scope, will lead to the same result in England. Let us hope that this will not be the case; but that a wise Legislature will see the danger in time, and apply the remedy, which will assuredly increase that good feeling that is so much to be desired between the owners and the occupiers of the soil of this country, and be for the lasting advantage of both classes, and of the greatest possible benefit to the teeming millions who inhabit this great nation.

CULTURE OF TURNIPS AND MANGOLD WURTZEL.

By Mr TODD, Mireside.*

IT would perhaps have been better if this subject had been introduced a few weeks earlier in the season, as by far the most general system of growing root crops is after a crop of oats; and I consider that to cultivate these crops with the best chance of success, we ought to commence with the preparation of the land—the oat stubble—immediately after harvest, as soon as ever the oats are out of the field, so that we are more likely to get the land properly worked while the weather is dry. The best way, in my opinion, is to plough the land over first, then apply lime. One who is considered a good authority says—"Lime is found to act in a very remarkable degree on the turnip crop. Land that has never been limed, or which has not been so for a great number of years, either refuses to grow turnips, or, if they do grow, they are always sadly injured ultimately by the disease called 'finger and toe.' We have seen so many instances of this disease being removed by lime, that we cannot look upon it in any other light than as a sovereign remedy in all cases of the same nature. The Norfolk system of cropping where turnips are repeated every fourth year, would undoubtedly cause a total destruction of the crop, were it not for the long-continued custom of marling frequently, the consequence of which is, that turnips are not more liable to disease in Norfolk than in other counties, where this crop does not recur oftener than every fifth or sixth year." Another states, that "the soils most liable to this disease are those of a soft, black, or moory nature; and as lime can be only sparingly used upon such land, the only other cure is a long rotation which embraces several years of pasture grass."

APPLICATION OF LIME TO THE SOIL.

The lime might be laid down in cart-loads and slaked ready to put on the land as soon as it is ploughed over; then harrow it in, and with two or three times grubbing, and as many harrowings, it gets well mixed with the soil, to get cooled before the spring; now clear the land of couch-grass and other weeds which will be brought to the top by the above operations, and if rather lumpy still, the best thing to run over it then is the chain-harrow, which will thoroughly separate all the weeds from the soil, and leave them loose and light on the top of the land, to be carted away, burned on the land, or ploughed in, to rot on the land during the winter. On sandy or gravelly soils, where we are most likely to fail during a dry summer, a covering of clay on such soils occasionally would be the greatest improvement, if it can be found at not too great a distance. For light peaty soils, not anything heavier, sandy clay would be best. The land should be ploughed again before winter if the weather will admit of it being properly done, to have it thoroughly loose and clean, so as to require only one ploughing in the spring. A good deal of our success depends on the land being thus prepared in the autumn. The land receives much benefit by thus lying light and loose over the winter, and will be ready for stitching for green crop after one deep ploughing as soon as the land is dry enough in the spring, about the first or second week in April. Then, after making the stitches or drills, putting in the manure (which ought to be broken very fine), and splitting the stitches to cover it in, the land is ready for the seed, and is no worse for lying a week in that state before the seed is sown, except on very stiff land.

* Paper read before the Wigton Farmers' Club.

N AND HOW TO APPLY THE SEED FOR MANGOLDS.

golds ought to be sown during the last
ys of April, or first week of May. The
· Rigg, of Abbey House, who was a very
iful turnip grower, found that the 25th
was about the best time to sow swedes,
lay, but that is three weeks too late in our
nerally ; of course there is a difference of
s. The first week of June is about the
sow common turnips. The drill ought
w close after the plough in dry weather,
here is moisture in the land. Where farm-
nanure is used, the stitches ought to be
lled and flattened down when the seed is
particularly at a dry time. A light horse
which rolls two ridges or stitches at a time
drill held by a man attached to it behind,
best kind. The roller passes once over
ge before and once after the seed is sown.
in this way there is more moisture. In-
annot work so easily in the soil, and the
come up stronger. Occasionally we see
from taking turnips too frequently off the
land, particularly if it is a light, poor soil.
is liable to be turnip sick as well as clover
Sometimes the seeds do not germinate on
it of the dryness of the season ; there is
fficient moisture in the ground, or, they
e growing healthy and well, and all be
yed by the beetle or flea. Now, in my
n, it is generally our own mismanagement
e way or another when we fail to get a
or to get the land clean. The land ought
prepared in September and October, and
t purpose we should keep up our strength
n and horses after harvest, and not have
nd to clean in the spring when the seed
l be sown. We ought to grow more
olds than we do. With proper manage-
and good seed, we may grow as heavy
of them, or nearly, as of turnips of any
We know they are not so likely to be
yed by the flea. They will keep longer,
emain juicy and palatable long after the
sh turnip has become spoiled by age.
os should all be used by about the middle
rch ; and we ought to have plenty of
old wurtzel to use with dry fodder in the
o months of spring, before the cattle are
l out to grass ; and swedes are not likely
ither destroyed by the flea, by worms, by
or anything else, if sown early—sown in
st or second week of May. Why should
sowing them during the last ten days of
when they have the most enemies to
contend with, and there is most risk? But if we should have to sow a part then, during that time when the flea is strongest, it will be necessary to sow 1 lb. more seed — at least 3 lb. per acre ; and to dust the land over with lime just at the time the turnips are coming through.

PRICE AND CULTIVATION OF TURNIP SEEDS.

Common turnips may be sown up to the 20th of June, but should seldom be sown later. We should always sow a small portion of the soft globe turnip, to be used first in the autumn, to be given to young cattle, to teach them to break turnips for themselves. A thing of the most importance is to get good seed. If we cannot purchase good seed, would it not be better to raise our own? A small portion of my swede crop this year is from 1 lb. of seed procured from a seedsman, at 1s. per lb. All the rest is from a farmer who raises his own from transplanted bulbs, and sells a quantity, the price paid for it was 2s. per lb. We are told there is little profit to the grower who sells it thus raised at 2s., but that it pays well to sell it at 2s. 6d. per lb. We can generally procure good swede seed so grown ; but the yellow bullock, which was once a great favourite and valuable root, is now so degenerated that if seed growers do not take more pains with it, or if it cannot be improved or restored, must either be very little grown or go out of cultivation altogether. I should like to see a few members of this club transplant a few bulbs in their gardens, of common turnips, and try to improve that kind : this is the time to do it. They ought to be put rather deeper in the soil than swedes ; and it would be well to spread a little light manure over them to protect them from the frost. Those who are not in the habit of raising swede seed could best do this. They should not be grown near together, else the produce would be hybrids.

PRICE OF MANGOLD SEED.

To shew the difference there is of seed, it is right to state that before I began to get mangold wurtzel seed from Mr Thomas Mann, of Crockhurst, I never could grow crops of mangolds of above half the weight. At first, a few years ago, he gave me a small quantity which they had left after sowing their own. It was ready steeped, and was sufficient to sow one drill or stitch the length of a field where I that year had about 2 acres sown, the seed of which was from two different, but both respectable seedsmen. There was as great a weight on that one stitch as on any two of the rest of the 2 acres, and all the same way managed. I have got seed from Mr

Mann, and grown heavy crops of mangolds ever since. This year I had 7 lb. from him, and paid 2s. 6d. per lb. for it. That quantity was sown on nearly 2 acres of moss or bog land, with a proper mangold drill, on the 1st and 3d of May. The stitches were twice rolled, and being loose light moss, were pressed down until the land was nearly level. Other years I have applied a little artificial manure, mixed with salt, along with farm-yard manure. But this year I have used only a rather small quantity of very rich farm-yard manure, without either salt or artificial manure of any kind. The quantity, as near as I can tell, would be about ten good cart-loads per acre. To ascertain the weights per acre, we carefully weighed, with the tops and tails on, but the soil clean washed off, 6 yards on a stitch of each kind where they seemed an average of the whole crop. Also, 6 yards of an extraordinary crop of swedes, grown on the same sort of soil, in the same field, and managed in the same way. The long red mangold wurtzels were 8 st. 2 lb., number of bulbs twenty-one; yellow globe ditto, 7 st. 9 lb., number of bulbs nineteen; swedes, 8 st. 11 lb., number of bulbs, twenty-one, each from stitches 6 yards in length, by 31 inches in breadth. The weights per statute acre weighed, on the 21st October:—

Red mangold wurtzel.....	47	13.3237
Yellow globe ditto.....	44	14.7862
Swedes.....	51	8.5860

A few days afterwards, thinking it would be more satisfactory, we weighed the tops cut off twenty-one mangolds on a 6-yards length, and the tops off twenty-one swedes on a 6-yards length (all the tops cut off just a little above the point of insertion into the bulb), and found the weights to be as under:—

Tops off twenty-one mangolds.....	16 lb.
Tops off twenty-one swedes.....	5 lb. 11 oz.

WEIGHT OF TOPS PER ACRE.

	Tons.	Cwts.
Mangolds.....	6	8.3248
Swedes.....	2	7.5344

WEIGHT PER ACRE WITHOUT TOPS.

Red mangold wurtzel.....	41	4.9989
Yellow globe ditto.....	38	6.4578
Swedes.....	49	1.0516

LONG RED MANGOLDS.

WEIGHTS (WITHOUT TOPS, AND CLEAN WASHED).

Weight per acre. Tons	Cwts.	Weight on 18 ft. by 2 ft. 7 in. st.	lb.	No. of bulbs.	Aver. Wt. of bulb. lb.	oz.
41	4	8	2	21	5	6
YELLOW GLOBE MANGOLDS.						
38	6	7	9	19	5	10
SWEDES.						
49	1	8	11	21	5	13

When we succeed in growing a crop of mangolds to weigh upwards of 40 tons per acre, a few of them (the bulbs) will often be 15 and 16½ lb. in weight. A good many of them will weigh half-a-stone, and very few of them will be under 3 or 4 lb. What is the value of such a crop of swedes? To be sure, we are within the actual weight; we will call them 40 tons. I think we may safely put them down at ¾d. per stone, to use for our own stock; ¾d. per stone, 6d. per cwt., 10s. per ton; then £20 for an acre of swedes or mangolds weighing 40 tons. A writer residing at Ipswich, Suffolk, in the *Royal Society's Journal*, in a prize essay, says—"In connexion with a farmers' club we have often seen this crop weighed, and also swedes. We found beet to vary from 14 to 44 tons per acre, and swedes from 10 to 25 tons. Here the beet weighs 38 and 41 tons; but the swede, instead of being little more than half, weighs more than the beet.

THINNING TURNIPS AND MANGOLDS.

In thinning turnips and mangolds the best way is by hand, then to be hoed not many days afterwards, taking care not to take too much soil from the plants, or to let them too much down. Three lads may thin or hoe an acre in a day. The weight of the crop greatly depends on their being judiciously thinned. Don't mind for 2 or 3 inches either way, less or more, to leave the finest plant. The best average distance, for weight and quality, is for swedes 12, and common turnips 10 inches. Mangolds 10 to 12. The best width for the ridges or drills from 30 to 33 inches. When we pull and clean them for storing, that they may keep better, care should be taken not to cut into the bulbs; the tops should be cut off above the point of insertion into the bulb, so that the leaves fall separately on the ground, and are more easily ploughed in. It is very common to let the turnips to pull off. We see the people at work with them; one cut generally serves for the root, another for the top. They seldom strike more than twice when the work is let, and often cut into the bulb, and often leave a great deal of soil on it. The better way is to take the soil carefully off with the back of the knife, and then keeping the knife the same side up, pull it through the top from the underside at the exact place, without striking at it at all in cutting off the tops. In storing, it is better if they are carted and covered up on the same day that they are pulled, a single night's frost may damage them very much; but they receive little harm from two or three nights' frost as long as the roots are in the

ground. Mangold wurtzel requires to be well covered up on the heaps, the way that we usually cover potatoes, with a little straw and a good thickness of soil. The expense of cultivating an acre of either will often be from £8 to £9 for labour, manure, and rent of land; part of this expense for manure is chargeable to the next crop, particularly if the tops are ploughed in, and for cleaning upon all the crops; for the real cleaning crop in the rotation is the root crop. As it is an expensive crop, at any rate it is better to be at a little extra expense for manure and labour to get a heavy crop, as the value of it may vary so much. We have seen some turnips this summer worth not more than 5s. or 6s. per acre, and a good crop may be worth from £15 to £20. My reason for introducing this subject is on account of the many great failures we see in the turnip crop. We cannot travel 100 miles north or south without seeing scores of acres bare, which ought to be growing turnips.

NEW CHRONICLE OF A CLAY FARM.

WE have to relate a nine years' experience of heavy land husbandry, which is in many ways so extraordinary as to merit a more than usual degree of public attention. In the autumn of 1861, Mr John Prout, a gentleman practically conversant with farming in Cornwall and in Canada, purchased two farms near Sawbridgeworth, in Hertfordshire, comprising 450 acres of clay and strong loam upon a subsoil of drift clay and cretaceous gravel. The land was undrained, except in parts, by shallow thorn drains; it had a staple soil 5 inches deep, having been for years ploughed at that depth by 3-horse teams; it was foul with root weeds, and in a very low condition of fertility. The cost price, including every expense connected with the purchase, amounted to £35 per acre. Drainage with pipe tiles, laid 3½ feet deep, and at intervals of 10 or 11 yards, was the fundamental process in the improvement; but as the cost and remunerative character of such an operation are thoroughly understood, it is not necessary to enter into the details of the work. The expense of providing new outfalls may, however, be mentioned. Cutting 130 chains length of new straight open ditches, filling up the old wandering watercourses, and levelling in a few moats, ponds, and waste places, cost £156; but as an area of ground to the extent of 2½ acres was thus acquired, adding so much to the estate at the price of £35 per acre, the outlay really incurred in providing these improved drainage outfalls was only £68. The two holdings in one ring fence numbered no fewer than 51 enclosures, averaging not quite 9 acres each, and what with meandering watercourses, straggling fences, brushwood, pollard trees, and other inferior timber, these antique boundaries were wasteful of ground, harbourers of weeds, birds, and vermin, obstructive of economical tillage operations, and very expensive to keep in repair. In the first four years Mr Prout grubbed up nearly 6½ miles length of bushy hedgerow, and filled in the ditches alongside, the outlay being £155. And as the abolished fences had averaged 7 yards in breadth—measuring between the outside furrows made by the plough—the estate gained 16 acres of cultivable land, which at the same price as the whole, was no less than £560. The hedge roots were given to the labourers, the brushwood was either buried in drains, or used for burning; but the 920 trees, consisting of pollards and trees of little value, came in for gates, gate-posts, and other stuff, valued at about £42. The total cost of the clearance was thus £311 in four years; the immediate return was 18½ acres of land at £35, or £647, 10s., making, together with the wood, £689, 10s. What the perpetual yearly gain in cheaper tillage operations, cleaner fields, and better crops may amount to is a matter for conjecture, but it must be very considerable. By exchanges of plots with the neighbouring owners the outside boundaries were made rectilinear, and the farm was divided into seven spacious fields of a generally quadrilateral figure. A main centre road of gravel was made, together with four straight grass roads of 10 feet breadth (formed by simple ploughing and rolling, and partially coated with small stones picked off the land), and from these roads or headland paths, Mr Prout's steam-ploughing engine cultivates every field, water for the engine being supplied from wells sunk at convenient points al

the roads. The outlay for this great facility of transport, and for the means of keeping the heavy engine off the land, was very little; considering that, for 62 chains length of new grass road laid down, 74 chains length of old road were ploughed up and added to the arable surface. The work of reclamation was completed in four years; at the end of which period the farm had been brought into the cleanly condition of a well-kept garden, and the whole had been ploughed and subsoiled 14 to 16 inches deep. At what expenditure of capital was this mechanical result effected? It is remarkable that the steam and horse power together cost no more than the horse labour which would have been necessary to carry on the old system of management with a 5-inch deep staple. Thus the maintenance of the ten horses which Mr Prout employed may be put down at £30 per horse, or £300 a-year. The outlay for the steam work, as calculated in Mr John Algernon Clarke's report in 1865, was also about £300 a-year, including allowance for wear and tear, depreciation in value, and interest upon the prime cost of the machinery. This total cost of the horse and steam draught power—namely, £600 a-year—is just the sum that would maintain a force of twenty horses, at £30 per horse as required for the 450 acres arable under the old shallow-ploughing system without steam The manual labour bill was a more serious matter, amounting to about £3800 in the four years, or an average of £2, 2s. per acre per annum. But as this included all the work connected with tile-draining the whole of the land (which expensive improvement will not need repetition), we have here no very formidable excess over and above a scale of labour expenditure which is common in high farming.

Now, let us inquire what Mr Prout had gained by this re-modelling and clearing his farm, by drying and aerating his subsoil, and trebling the cultivated depth of his staple. If we said that, in place of a farm worth 27s. per acre (which was the former rent) he was now in possession of a farm worth a rental of 40s. per acre, we should not be overstating the profit which permanently accrued to him for four years' moderate outlay in improvements. As actual evidence of the high degree of productiveness developed in the soil by the deep steam tillage, we have the extraordinary system of farming which has been, and is still being, pursued upon it.

In 1864, the third year of Mr Prout's occupation, the wheat, barley, and oat crops off 250 acres were sold by auction, as they stood upon the land, the purchasers taking away both corn and straw. Most part of the roots on 30 acres were also disposed of at the same time, together with about 300 tons of straw, the produce of about half that number of acres in the preceding year, 1863. When the Committee of the Royal Agricultural Society visited the farm in the autumn of 1866, they found that the whole of the land had been under crop that year, including 223 acres of wheat, 124 acres of barley, 60 acres of oats, 33 acres of tare and sainfoin hay and 4 acres of roots, and all had been sold just before harvest; the purchaser reaping, carting, thrashing, and carrying away both grain and straw. The same exhausting practice has been continued every year since that time, so that all the corn, all the straw, and all the hay (with small reservations toward feeding the few farm horses kept), have been sold off the land in 1867, 1868, 1869, and 1870, and in the present year every acre has borne produce. The peculiarity of the business is, that this successive corn farming is conducted without any live-stock. In 1863, Mr Prout fattened 58 oxen; in 1864, he kept only a single cow; in 1865, he fed 14 bullocks, and they were the last that have been on the land or in the premises. In 1868, a few pigs were fattened, but since then the only animals kept have been one milch cow and six working horses. Mr Prout has no pigs, and has never had a sheep on the farm during the whole of his nine years' occupation. Thus it has not been by a plentiful consumption of sheep and cattle food that the fertility of the soil has been kept up; and the Committee of the Royal Agricultural Society reported, in 1866, that "the course here pursued is exceptional, and must soon come to an end. Manure will soon be needed. When this time comes, Mr Prout is prepared to maintain a flock of sheep, to grow plenty of roots for them, and to feed the roots off upon the land, heavy as it is." But upon visiting the place a few days ago, after Mr Prout has had four years longer experience of his land, we find all thought of the sheep-fold or the yard of cattle, or even of purchasing stable-manure from London in return for the straw sold off, to be as remote as ever. Mr Prout raises crops from every acre of his farm solely by virtue of deep steam culture, and the application of artificial manures. His plan is to give a dressing of about 50s. worth of bone-dust and superphosphate per acre for every crop, a portion of the mixture being guano, when one white straw crop follows another. Look now at Mr Prout's

sition. His crops just before harvest in the esent year, comprising 208 acres of wheat, 57 res of barley, 102 acres of beans, and the hay 55 acres of sainfoin, twice mown, were sold i the ground for £5300, the wheat averaging 15 per acre, the barley £10 per acre, and the ans £8, 17s. per acre. And though in some ses the judgment of the buyers may have en at fault, the fact that many of the pur-asers have bought cropping on the farm year fter year shews that the prices realized at the uctions cannot be generally in excess of the true arket value. The produce of the year 1870 has ade £5330. What is the expenditure? So ttle manual labour is involved in pursuing the orn husbandry of this farm, that the labour ac-ount, including the wages of the steam-plough nen, and also £50 worth of work upon permanent mprovements, comes to only £520 for the year. Six horses (there will be only four in future) for vhich food is partly purchased and partly de-ucted from the saleable produce of the farm, nay be put at £180 a-year. So astonishing has een the saving in tillage operations, consequent pon the cleanliness, the depth, and the improved exture of the soil, that the only steam work re-uired for the year has been 530 acres of plough-ng and scarifying, all executed in the two nonths between harvest and the middle of October, and the cost of coal for the 14-horse ower Fowler engine has amounted to not more han £42. We may add £5 for oil, &c. Then he item of wear and tear on the engine and nachinery has averaged, for the nine years, £77 er year, including a new fire-box, only just put n, renewals of wire rope, shares, and all wearing arts, and some rather expensive substitutions f improved mechanism at various times, for Mr Prout's apparatus was procured before many mportant improvements had been introduced. The number of days' work per year being only bout half what it was in the earlier part of Mr Prout's undertaking, it is not fair to saddle an average cost of wear and tear upon the year 1870, but for the sake of being within the mark in our statements we will do so. The engine and machinery at the present time appear little the worse for their nine years of service; but we must set down for depreciation in value, say five per cent. upon the prime cost of £1065, or £53, and we must add interest upon capital also at five per cent., or £53 more. The cost of steam, horse, and manual labour, then, amounts to £930. Add for seed, say, £250, and for artificial manures about 50s. per acre, or £1150, and the main working expenses of the farm amount to £2330. We may allow £2 per acre for rent, and 10s. per acre besides for rates, taxes, and other outgoings, making together £1120, and we have a total yearly outlay of £3450 procuring a return of £5530, and leaving £1880 as tenant's profit. A rare season for corn farming must be credited with much of this grand result; but the deficient harvest of 1869 yielded a produce which sold for £3742, although 55 acres were that year in fallow; and in the good year 1868, the auction of grain, straw, and hay realized £4726. So that the average annual return for 1868, 1869, and 1870, has been £4600; and at the present rate of expenditure,—namely, £3450, the tenant's yearly profit has averaged £1150.

Of course the mere impossibility of finding a market for an unlimited quantity of straw must prevent such an export system of agriculture from becoming general; but if the straw were converted into manure and returned to the soil in the usual order of husbandry, the purchased fertilizers would not be required. Mr Prout's experience, however, proves what a wealth of fertility is latent in the depths of a strong subsoil; and there are thousand of farms in England needing only the same thorough cultivation and liberal manuring to yield a similar profit.

THE FEN COUNTRY.

By Mr Alfred Ruston.

EARLY ATTEMPTS AT DRAINING THE FENS.

WE make the following extracts from the essay:—

Richard de Rulos, chamberlain to William the Conqueror, devoted himself with great zeal and energy to the pursuits of agriculture. On his uplands, the lands above the flood level, he was renowned for his good tillage and his successful breeding of cattle; and on his low lands he projected and carried out, at immense cost, great works of reclamation. By constructing strong and substantial banks to prevent inundations from the Welland, to which they were constantly subjected, he converted those low-lying grounds about Market Deeping (which signifies a deep meadow), and which before were deep lakes and impassable fens, into fruitful fields and pastures, and we are told "he reduced the most humid and moorish parts thereof to a garden of pleasure. We are likewise told that "by the like means of banking and draining he also made a village, in the very pan of Pudlington, and by much labour and charge reduced it into fields, meadows, and pastures, which is now called Deeping St James." The Romans, bringing with them a higher civilization, performed various works of drainage, and made roads, and in other different ways sought to improve the fen country, and numerous traces of their skilful and intelligent labour are still discernible. The religious houses expended considerable energy, and not a little wealth, in their efforts to bank out the waters, to keep the outfalls well open, and in other practical works of drainage; for William of Malmesbury, writing in the eleventh century, represents Torney as "a very paradise, for that in pleasure and delight it resembleth heaven itself." This paradise was subsequently lost, but how far through neglect of outfalls and other works, and how far from uncontrollable causes, I shall not venture an opinion. Suffice it to say it was lost, and it has only been during the present century that it has been fully regained. In the reign of the 7th Henry, John Morton, Bishop of Ely, made a channel from Standground to Guyhirn, still called Morton's Leam, which Dugdale says was "a work certainly of singular consequence, not only for the quicker evacuation of the overflowings of Nene, but for conveniency of carriage from Peterborough to Wisbech." The drainage of the great watery waste appears never to have been lost sight of, and yet for centuries no great effective works were undertaken, and no specific legislative measures, relating exclusively to the Fens, were passed. To protect the country from the ravages of the sea, and to maintain water-courses for purposes of drainage, appear to have been considered duties devolving on the sovereign and his subjects; and when necessity arose or occasion required it, the Crown granted a Commission to inquire into and remedy whatever faults were found to exist. These Commissions were sometimes, justly or unjustly, deemed oppressions. Hence we find in Magna Charta it is provided, "No town nor freemen shall be destrained to make bridges or banks, nor should any banks be defended, but such as were in defence in the time of King Henry, our grandfather, by the same places and bounds as they were wont to be in this time." In 1531, in the reign of Henry VIII., the law known as the "Statute of Sewers" was passed. From that time Commissions of Sewers were occasionally granted, and some partial works were done under them in the "Great Level," as it was termed, but nothing of a permament character. In 1570, in the thirteenth of Elizabeth, a more extended Commission was granted to Sir William Cecil, son of the first Lord Burleigh, and ten other influential persons, who, on the 9th of June of the same year, sat at Peterborough, but nothing in reality was accomplished by it. For thirty years no further progress was made, but in 1600, in the forty-third of Elizabeth, what was called the "General Drainage Act" was passed. This Act was intituled, "An Act for the recovery of many hundred thousand acres of marshes, and other grounds, subject commonly to surrounding,

* Paper read before the Farmers' Club.

within the Isle of Ely, and the counties of Cambridge, Huntendon, Northampton, Lincolne, Norfolke, Suffolke, Sussex, Essex, Kent, and the county palatine of Duresme," the preamble whereof runs thus: "When it is apparent to such as have travelled in the execution of Commissions of Sewers in the isle of and counties aforesaid, that the wastes, commons, marshes, and fenny grounds there, subject to surrounding, may be recovered by skilful and able undertakers; whereby great and inestimable benefit would arise to Her Majesty, her heirs and successors, disburthening Her Highness of many chargeable banks and works of sewers, within those surrounded grounds, as the increase of many able subjects by habitation being there erected, and in like sort profitable to many of Her Highness's subjects, both bodies politic and corporate, who have estates of inheritance and other interest within the same. And for that the draining and making dry and profitable of those surrounded grounds is chiefly hindered; for that the greater part of them are wastes and commons, subject yearly to surrounding, wherein divers have common by prescription by reason of their residancy and inhabitancy; which kind of commons, nor their interest therein, can by the common law be extinguished or granted to bind others which should inhabit there afterwards. And in that also it appeareth, that the Commoners, in respect of their poverty, are unable to pay the great charges to such as should undertake the recovery of the same." It then proceeded to give power to the owners of these lands to make contracts with such persons as would undertake the draining, such contracts and conveyances thereupon being "made good and available in law against the lords of the soil and all other the Commoners therein." This Act was passed so near the close of Elizabeth's reign that little was done; but her successor had scarcely ascended the throne ere he resolved to attempt the reclamation of the Great Level, and in the second year of his reign we find James I. appointed the first Commission for this purpose, but without any great practical results. Successive Commissions for seventeen years were equally fruitless. Schemes were projected, expensive views taken, plans decided upon, but the works did not proceed. Opposition was aroused, and disputes between the country and the Commissioners were bitter and constant, and the King was petitioned again and again to restrain acts of supposed injustice; lawsuits were commenced both against the Commissioners and those in their employ; everything to retard, and nothing to advance the work. James, wearied and annoyed by these repeated failures, and incensed by the determined and resolute opposition everywhere met with, said, "that for the honour of his kingdom, he would not any longer suffer these countries to be abandoned to the will of the waters, nor let them lie waste and unprofitable;" and to ensure success and promptitude of action, he at once declared himself the principal undertaker. How true it is, "Man proposeth and God disposeth;" for just at this important juncture, when success seemed so well assured, his attention is diverted from the Fens to the Continent, and his daughter's husband earnestly implores him to aid in the restoration of his forfeited dominions. These family and other troubles effectually stay his drainage schemes, and he bequeaths to his successor this gigantic undertaking. Until the fifth year of his reign, Charles I. appears to have taken no decided action towards freeing these submerged lands from the waters which desolated them; but on the 6th January 1629, a Session of Sewers was held at Huntingdon, which in its wisdom decreed that a rate of 6s. per acre should be laid on all those "marsh, fenny, waste, and surrounded grounds," in order to their draining. But, notwithstanding all this show of business, nothing was done. The tax was not collected, and the works were not proceeded with. In the month of September of the following year another Session of Sewers was held at Lynn, when something more definite and hopeful was accomplished. There were nearly fifty Commissioners present, and they entered into a contract with Sir Cornelius Vermuyden, a Dutch engineer of great skill and experience, to drain the Great Level, offering to give him, as his recompense for the works undertaken, 95,000 acres of the surrounded lands. I would here observe the word *surrounded*, so frequently used in these old documents, means simply *flooded* or *inundated*. Once more the prize so nearly gained tantalizingly eludes the grasp. Prejudice, deep-rooted and omnipotent, impels these Fen men to a course of determined hostility, and they resolutely refused to ratify the contract sanctioned by the Commissioners, not from any intelligent conviction of the insufficiency or unsuitableness of the scheme itself, but simply and solely because Vermuyden was an alien born. Having done this, and upset the contract, they then turn round and do a very wise thing. They become "humble suitors" to Francis, then Earl of Bedford, an owner of some 20,000 acres in the Le

and solicit him to undertake the work. This request is supported by the Commissioners, and the Earl assents. On the 13th of January 1630, another Session of Sewers was held at Lynn, when the contract, commonly known as the "Lynn Law," was made. In this law the Earl engages to commence the work forthwith, "and to finish it, so as to make the grounds fit for meadow, arable or pasture, within the compass of six years from the 1st of October following." He is to receive 95,000 acres of the drained land, these whole 95,000 acres to be liable to the first finishing of the work, and 40,000 acres, part of the same, for its subsequent maintenance. Provision was also made that when 30,000 acres should be finished, the Earl should have his proportion of it. The Earl enjoyed the confidence of the country. His fortune was ample, and his character commanded universal esteem. The opposition which had so successfully thwarted all previous efforts to drain the Level, was no longer experienced. Unanimity prevails, and the whole country gathers around the Earl and proffers its assisstance. In the following year, the Earl and thirteen other gentlemen of rank and wealth interested in the country, who had become associates with him in the adventure, entered into an agreement among themselves, commonly known as the "Indenture of 14 Parts," whereby the undertaking was divided into twenty shares, and the adventurers were for each share to sustain proportional shares of the charges. On the 13th of March 1637, the Earl and certain other persons were by letters patent incorporated. This charter of incorporation gave them certain other powers, besides making them guardians of all the waters, rivers, and fens, within the precincts of the Level, such as the building of churches and chapels, and making churchyards, "in such fitting places of the said Fens as they shall judge meet, and to cause them to be consecrated by the bishop." This breath of royal favour inspired the Earl and his co-adventurers with spirit, and they vigorously pushed on the work; and on the 12th of October 1637, the whole Level was adjudged drained, and the 95,000 acres of land were set out for the Earl's recompence. This ray of kingly sunshine, unhappily, was only the prelude to the approaching storm. The cloud was gathering thick and portentous, and was soon to burst on the noble band of adventurers. For, on the 14th of April 1638, at a Session of Sewers held at Huntingdon, the Earl of Bedford's undertaking was adjudged defective. The King, professing a great desire to make these 400,000 acres in the Great Level good winter as well as summer lands, which he considers the Earl has failed to do, consults Sir C. Vermuyden and others competent to advise him and at a Session of Sewers held at Huntingdon on the 18th of July, causes himself to be declared the undertaker, the bargain being that he shall have not only the 95,000 acres which had been formerly set out for the Earl of Bedford, but also 57,000 acres from the country additional. But in consideration of the great expenses incurred by the Earl and his participants in their efforts to perform the undertaking, he was to receive 40,000 out of the 95,000 acres. Charles, like his royal predecessor, when proclaimed undertaker, projects grand works, and pictures to himself great and speedy results. One of his pet schemes was to build an eminent town in the midst of the Level. At the village of Manea, which was to enjoy the euphonious name of Charlemont, he had himself drawn the designs, and intended making a navigable stream from this chosen spot to the Ouse. But, like James too, just as his plans were ripening, and he was preparing to take prompt and active measures to accomplish his purposes, his attention is diverted from the Fens to other more important and disastrous scenes, which finally result in the loss of his crown and of his head. National disquietude was inimical to Fen interests, and the works which the Earl of Bedford and his associates had at such immense cost constructed, were allowed to go to decay, and the drains were rapidly growing up. Francis, Earl of Bedford, the old, and Charles I., the new undertaker, were both dead. William, son to Francis, succeeded to his father's earldom, and inheriting much of the spirit and enterprize of his father, applied, with others of the adventurers, in 1649, during the Commonwealth, to the Parliament sitting at Westminster. Parliament listened to their application, carefully examined all former proceedings, declared the decisions of the Huntingdon meeting null and void, and entrusted the works to the new Earl on the general plan of the "Lynn Law." This Act of 1649 was called the "Pretended Act," it not having been re-enacted on the restoration of Charles II. The new undertakers began in real earnest, and made good speed. The old works were repaired, and new ones constructed, and on the 25th of March 1653, the Level, by a decree of Sewers made at Ely, was adjudged to be fully drained, and the Earl and his co-adventurers had the 95,000 acres of land awarded to them. The Great Level henceforward took the name of the "Bedford

In 1663, in the fifteenth of Charles II., ras brought into Parliament to make the irers a corporation, and during that became law. This Act made the urers a corporation in perpetuity. The r of their continuance is prescribed; their are declared; the whole 95,000 acres, compence for the work of draining, are subject to taxes, to be annually laid and for the support and maintenance of the of the Level; the public meetings of the ation are fixed; and the business of those gs directed. From that time to within t few years an Earl or Duke of Bedford en the Governor of the Corporation. But occasion of the North Level, in which the s property is situated, being legally ted from the corporation, he withdrew as succeeded by the Earl of Hardwicke, resent governor. From what has been y stated, it will be seen that the work of ning this vast area of inundated land was y task; but one fraught with immense and curring difficulties, and required men of nerve and intrepid courage to undertake nd it affords an apt illustration of the fact ubjects, rather than sovereigns, can most be entrusted with the prosecution of great al enterprises.

r giving a very interesting sketch of the ities of the Fens, Mr Ruston made the ing remarks about

RECENT DRAINAGE OF BEDFORD LEVEL.

1841, general discontent began to prevail, and es for improved drainage were projected, which d in the adoption of a plan submitted by Mr r, which, in 1844, received the sanction of Par- t. Mr Walker avoided the error of Vermuy- nd gave his first consideration to the outfall. usly to this time the waters, as just intimated, een discharged by the Tongs' Drain into the

Mr Walker decided to cut a new drain to a 9 miles nearer Lynn, just at the top of the rink Cut, thereby giving a greatly improved fall e waters. Probably, in times of pressure, the nce would be as much as 10 feet, or even

Having secured this immensely improved out- Mr Walker then sought to adapt the internal to it, increasing the dimensions and depths of ains accordingly, and, where practicable, giving ral drainage, and, where otherwise, reducing the ements for mill power to a minimum. The tages resulting from Mr Walker's scheme can- ell be over-estimated. Formerly the waters eld up in shallow streams, between two high , which banks, in early Fen history, were s of perpetual disquietude to Fenmen, as during every flood there were apprehensions of a breach, and these breaches were not unfrequent. Since the Eau Brink Cut was opened, these breaches have been less frequent, but where water is carried between banks several feet above the level of the surrounding lands, there is always danger; besides danger there is leakage, and unless the banks have good puddle walls of clay in them, this is ofttimes a source of considerable difficulty and expense, and in addition to these evils there is the increased pumping power required. It is a self-evident fact that the higher the head of water against which you have to lift, the greater will be the lifting power required, and the less will be the discharge. Since Mr Walker's plans were carried out these things have ceased to exist in the Middle Level; but half a million of money was expended in securing the advantages it enjoys. Since these works were erected, the Two Miles Estuary Cut below Lynn has contributed to improve the outfall, by increasing the depression at low water-mark in the Ouse at Lynn 3 to 4 feet, and at St German's, where the Middle Level waters are discharged, 2 to 3 feet. But the increased scour of the Ouse is a source of danger as well as of drainage benefit. Already two sluices have succumbed, and twice has the country been excited and alarmed by reported failures of the Ouse banks; and did I possess the spirit of prophecy which some people seem to enjoy, I should venture to predict that we have as yet not heard the last of these reports, but that sooner or later those banks will be occasions of disaster to the country. Since the failure of the Middle Level Outfall sluice, in 1862, the country has been drained by syphons; this plan was suggested by Mr Hawkshaw, and has thus far been successful. There are sixteen of these syphons, each 3½ feet in diameter, and about 150 feet in length, placed over the bank which was put across the main drain to stop the inflow of the tide after the sluice failed. There is every appliance which science can devise for keeping them in efficient working order. Probably, in any new drainage schemes a sluice would be preferred to syphons, but the Middle Level has occasion to speak well of the syphons, and although their present number may possess less discharging power than their old sluice, and there may be some slight loss of fall, yet upon the whole they have worked satisfactorily, and have kept the Level well drained. The large sum of money expended by the Middle Level under its Act of 1844, on works properly belonging to the Bedford Level Corporation, and which it had failed to adapt to the requirements of the Level, occasioned dissatisfaction amongst the proprietors of the Middle Level lands, and led them to seek a separation from it, having their own works and share of funds placed exclusively under their own management. Parliament sanctioned the separation in 1862. The North Level, as far back as 1753, had been practically and virtually separated from the Corporation, its share of the Corporation funds being secured to its own uses, but it was not legally and technically sepa-

rated from it until 1858. The North Level took the lead in securing a good and efficient drainage. By making a new river 8 or 9 miles in length, and by cutting off another long head by another straight cut of about the same length, they gained an additional outfall of some 10 feet, which enabled them to do away with all pumping power, and for forty years they have now enjoyed a good natural drainage, their waters falling by their own gravitation to the sea. The South Level, having lost both the North and the Middle Levels, now enjoys the honour of being itself the Bedford Level Corporation. By an Act passed in 1827, some part of this Level was benefited, but no great and comprehensive scheme for giving the whole Level a more perfect and efficient drainage has yet been submitted to Parliament. Considerable benefit has been necessarily derived from the Eau Brink and Estuary Cuts, but to reap the full advantage of these a new outfall much nearer to Lynn is required. The old outfall at Denoier Sluice is still retained. This being some 10 miles higher up the Ouse than the Middle Level point of discharge, there is a consequent loss of fall of several feet; and this necessitates the keeping of the waters filled up in the rivers between high banks, the level of the water being some few feet above the level of the land, whereby they are exposed to all the evils incident to this primitive, but imperfect system of drainage. Last Whitsuntide, the Bedford Level Corporation received a memorial from the Commissioners of the Waddenham Level Drainage, which stated that at their last half-yearly meeting "it was unanimously agreed to incur great and necessary expense in puddling the north bank of the old west river, as there are reasons to apprehend that in the event of a flush of water in the river, the leakage through the banks would be greater than the memorialists' engine could keep down. The memorialists are of opinion that the work is absolutely necessary for the preservation of their Level, though the bank is not within the limits of their jurisdiction." From what I have already stated respecting the draining of this "Great Level" (and I have confined my observations mainly to this, and it sufficiently illustrates the drainage of all fen lands), the inference is easily deducible, that if fen lands are to be perfectly and successfully drained, the true principle is first of all to secure the best possible outfall for the discharge of the waters, and then to construct the internal works of corresponding dimensions and depths, giving, where practicable, a natural drainage, and, where not, reducing the pumping power to a minimum; and sooner or later I conceive this will be the principle adopted by all the drainage levels in the kingdom. One important and somewhat startling fact in connexion with the review of the drainage history of the Great Level during the last two or three centuries strikes one, and that is, that all the great works which have contributed to drain the land effectually, rescuing it from all risk of winter floods, and making it really valuable, have been made during the present century. At the beginning of the century, the lands were little more than summer lands, and men were considered demented who ventured to sow a whole field of wheat. But now the Fens are the great corn-producing lands of the kingdom, and have been not inaptly termed "the granary of England." In 1774, the Fen Country had excited so much interest that Lord Oxford and a party of friends resolved to take a cruise "in the narrow seas" in the Great Level, and accordingly had a fleet fitted out at Deptford and Ely, and in July commenced their twenty-one days' cruise. They passed through Denoier Sluice into the Ouse, and thence through Salter's Love Sluice to Well Creek, and so through the Level. At Whittlesea Mere, the great reservoir for fen waters, they amused themselves with fishing, and got up a regatta, they also received a visit while there from Lord Sandwich, the first Lord of the Admiralty, and some of his naval friends. In cruising down the rivers, they took some very lordly liberties, which I fancy would be speedily avenged in these days. Where bridges were formed to obstruct the passage of their ships, they simply knocked them down and passed on. Lord Oxford's racecourse and fishing-ground is now the home of flocks and herds, and teems with rich abundance. The eel, the perch, and the pike, have yielded to the bullock, the sheep, and the horse, and the lake-billow, which when tempest-tossed brought sickness to the cruisers, has given place to the golden wave of plenty.

SUBSIDENCE OF FEN LANDS.

The subsidence of Fen lands after they become drained is a subject deserving attention. The more we drain, the lower our lands become, and we are beginning to inquire what is to be the end of all this. I am informed by Mr Laurance, the agent to Mr Wells, that when Whittlesea Mere was drained, to ascertain accurately what the subsidence was, a Doric column was placed in the ground, on which feet and inches were marked downward from the capital, which was the original surface of the land. That surface is now 7 feet below what it was when they began to drain the Mere eighteen years ago; and in the Middle Level, on all our old drained lands, we find the subsidence is still going on at the rate of 1 inch per year. We learn this from our drainage engines, which are continually requiring the centres of their water-wheels to be lowered, or the ladles to be lengthened, or they would soon lose their dip altogether. The increased facilities of discharge through the improved outfalls must continue to be felt until the peaty subsoil shall well nigh disappear. One of Lord Oxford's companions, on referring to their passage through Salter's Love Sluice, tells us that the tide at that place rises 5 or 6 feet. On the 21st of February of the present year, it rose to 22 feet 3 inches at 11.15 P.M. The effect upon drainage of this altered state of things, and consequently upon subsidence, must be obvious to every one. The Fen rivers and

uins, so useful and essential for the discharge of the od waters of winter, are scarcely less valuable for the pply of fresh water in the summer. It is not easy over-estimate the immense value of a good and liberal pply of fresh water for the whole Fen country during e dry summer months, and I need hardly say every fort is made to obtain this. The practice of irrigation is not found much favour in the Fens, and it is uestionable whether it would be of any great good here the waters possess so few fertilizing elements. rigation appears to depend for its success very much upon the chemical properties contained in ie waters. An analysis of the water will pretty correctly indicate what will be the effects of its overflow.

CULTIVATION OF THE FENS.

Cultivation and drainage have gone on hand in and, each successive improvement in the one leading o a corresponding improvement in the other. During the early drainage history, most of the low-lying Fen lands were kept in grass, as they could not be profitably brought under cultivation, in consequence of heir liability to inundations during every recurring lood. Some farmers ventured to sow a few oats on he higher lands, but it was not until May was well in, and the winter rainfalls had passed away to sea. By-and-by, oats were grown more largely, and wheat was cultivated to some extent. Then came the system which prevailed very generally in the Fens for a good number of years, and which was to let the land keep in grass for two or three years, then pare and burn, and sow with coleseed to feed with sheep during the winter months, to be followed by oats, and then wheat; and again sown down with seeds, to remain two or three years—often three. This virgin soil, under such management, produced coleseed of most extraordinary fattening qualities, and perhaps there has never been any natural food that would compare with it, or that would in so short a time produce so much weight of mutton. It was otherwise with the seeds, for after the first year they contained comparatively little nutritive properties, and their long continuance on the land made a fine refuge and breeding-ground for the wire-worms, to which the succeeding crops ofttimes bore indubitable testimony; and to this day they remain the greatest foe to successful cultivation the Fen farmer has, and it is a very occasional year when his oat crop is not more or less ravaged by them. Probably the greatest improvement next to drainage, and consequent upon it, is the practice of claying Fen lands. The value of clay, I believe, was first accidentally discovered by some of it which had been thrown from the ditches, having been spread round the outsides of the field, and which produced most marvellous effects upon the growing corn crops. Our fathers were not slow to learn, and very soon had to adopt a system of claying which still continues, some lands having been gone over three or four times. The plan is this: pits or trenches are made down the field, from 2½ to 3 feet wide, and 12 to 16 yards apart; two spits of clay are taken therefrom, and spread upon the intervening land, the peat or clunch subsoil being thrown to the bottom of the trench, and when all is finished, the pits are ploughed in, and the land being loose, and easily moved, is soon levelled again. The cost of claying is governed by the depth at which the clay is found from the surface of the land; but improved drainage occasioning a continual subsidence, as I have already observed, is bringing it within easy reach, and thousands of acres can now be done at a cost of 30s. per acre, and under; and no money expended upon a Fen farm yields so quick and so bountiful a return. The application of clay to these light soils not only gives solidity, but being possessed of considerable fertilizing properties, greatly enriches them. Happily, the Fen lands very largely rest upon a clay bed; but the clay is not of a uniform quality. That which is blue, and of a soft buttery nature, contains the most lime, and is the best fertilizer. Some is silty, and some stony and hard, and these do little more than solidify. Perhaps the next great improvement consequent upon the drainage of Fen lands is their deep cultivation, to which reference has already been made. To talk of turning over a furrow slice 30 inches in thickness, must sound to a clay-land farmer something like a piece of exaggerated nonsense; I may put his credulity to the test, as surely as some of the wonderful statements he occasionally meets with now-a-days in agricultural newspapers; but we all know it is no exaggeration. Deep cultivation on Fen land is generally accomplished by horse-power, as the great underground forest offers considerable obstacles to the application of steam. A pair of horses in a common plough go first, and take a furrow 4 or 5 inches thick, and are followed by a huge implement made expressly for the purpsose, and which is pulled by six, eight, or ten horses, as the case and required depth may be. This plough buries the furrow turned over by the small plough, and brings the subsoil well on to the top, that its vegetable properties, by exposure to the atmosphere, may become speedily decomposed, and made avaliable as food for plants. One object in putting the top furrow down, is to get it as far as possible beyond the reach of atmospheric influences, with the idea that under these circumstances the twitch and couch and weed roots will die and decay. It certainly is a very clever and ingenious way of cleaning land, if it can only be done; but my experience and observation lead me to the conclusion that it far oftener fails than succeeds. I think land should be quite clean ere it is deep ploughed. There can be no doubt that deep cultivation tends to preserve moisture in the soil in dry seasons, and to facilitate drainage in wet ones. It also unlocks those hidden treasures in which are so many elements of fertility, and consequently increases the producing power of the land. Drainage, clay, and deep tillage, to which should be added superphosphate of lime and the water-drill, have completely metamorphosed the country, and altogether changed its modes of hus-

bandry; and perhaps at the present day there is no country which is so utterly deficient of system. Every one sows what he thinks will pay, and by liberal management labours under no apprehension that his soil will become exhausted; nor will it, if he treats it generously, and cultivates it wisely.

ROTATION OF CROPS.

Although there is no uniformity of system in the cultivation of Fen lands, there is, however, a five-course shift which has found favour, and which prevails more largely than any other, and to which several farmers pretty strictly adhere. This is the order of it: — Mangolds, kohl rabi, coleseed, or cabbages, which are gradually growing into favour; oats, wheat, seeds, wheat. The green crops and the oats are sown with artificial manure, the farm-yard manure being reserved for the wheat crops. This rotation appears well suited to the Fens, and has been pursued with considerable success; but, as I have intimated, Fen farmers are impatient of the restraints of system, and break away from them to follow their own inclinations. A ride through the Fen country at the proper season will afford ample evidence of the truthfulness of this. In addition to the crops ordinarily found on a farm, will be seen coleseed, turnip seed, linseed, mustard and cress growing as seed crops, and potatoes and carrots, extensively cultivated for the London and other large markets. Turnips are not at all suited to Fen soils. They grow of a woody fibrous quality, coarse, and long in the neck, and possessing scarcely any nutriment; they are, indeed, almost valueless as food for stock, and are consequently not cultivated. Kohl rabi and mangolds are much better; but these, like the hay, straw, and other products of Fen lands (coleseed excepted) are very deficient in fattening properties. I have already referred to the water-drill and superphosphate of lime, and their value in the successful cultivation of Fen lands. Our Fen soils appear to yield much larger supplies of ammonia than of phosphates, hence the free application of phosphatic manures is accompanied by much greater and more palpable results than is the case where ammoniacal manures are used. Probably, there is no part of the kingdom where the application of phosphates to the soil has produced such startling results, and especially where they have been applied with the water-drill. The Fens have not been specially famed for the breeding of either cattle or sheep, but from very early times they have been noted for their good breed of cart-horses. The decreased acreage of grass seeds, consequent upon the increased acreage of corn and other crops, has largely tended to diminish the number of animals bred; but the show of cart colts, both as regards number and quality, on the 1st of July of every year at Thorney, is pretty good evidence that Fen farmers have not altogether lost their long-enjoyed and well-merited reputation.

Papers by Tim Bunker.

o. 59.—TIM BUNKER ON JIM CROW.

MR EDITOR,—It may seem an ungracious task to say a word against iis gentleman, when everybody is writing im up, but I've no prejudice to influence ıy opinion on the crow question. You said ou wanted all the Hookertown news, espeially if it had any bearing on farming. Now, ou see, we have had a big ferment in the 'armers' Club up here on this question, hich is certainly as old as I am, and I uess as old as the country. I thought it ıad been settled several times, but it is one f them questions that does not remain ettled. I expect it is because we haven't ot upon the right foundation yet. I have lways noticed that any unsound opinion kept working in the public mind like bad ood in the stomach. It won't stay down. Hookertown has spoke, and I rather think Jim Crow is settled for ever.

You see these creatures had been uncommon plenty last season, and we had all suffered more or less from their depredations in planting time, and this had been put down as one of the things that was to be discussed and settled in the Club this winter. "Jim Crow, shall he jump, or no?" In old times they said no, and offered a premium on crows, and the boys used to hunt them, and bring the young ones by the basketful to get their pocket money. Then the men, who were scientific on birds, thought the boys killed a good many grubs, and paid them that way, and said we must not kill them.

Deacon Smith was chairman for the evening, and stated the question. He said, it admitted that the crow did some good and a great deal of mischief. The point to find out whether he did more good than harm. Mr Sparrow said he did not think there was any question at all about it. He knew what he was about when he got the law passed to give a bounty on foxes and crows. He said both of 'em were the farmer's enemies, and he didn't know which was the worst. He said our fathers understood their cases, and killed them off as fast as they could lay hands on them. Talk about crows destroying bugs! He has shot 'em many a time, and he always found more corn and carrion in their crops than anything else.

Cicero Smith said he was astonished to hear such sentiments from his venerable friend. He thought the crow had not been made in vain. If it had not been for some good end, he would never have been brought into existence, and been made so hardy and prolific. He was a very long-lived and very shy bird, so that with all the warfare which men had made upon them they were as numerous as ever. They were the farmer's friends, picking up a multitude of grubs and worms that preyed upon his crops, and acting the part of a scavenger in removing dead animals that would otherwise pollute the atmosphere; they pulled up some corn, to be sure, but every labourer was worthy of his hire.

Mr Spooner, our minister, said he found some difficulty with Mr Smith's argument. A good many creatures had been made for a different state of the world than existed at present, and if we admitted that they were originally useful, it would not follow that they could not very well be spared now. He said they had found over in Shadtown, and in many other places, the remains of extinct birds, beasts, and fishes. These fossils had had their day, and died out, or been killed off, because they had become nuisances. He was inclined to think that it was about

time for man, who was lord of nature, to dispense with the services of the crow; he could join the great company of fossils without disturbing the balance of nature. He admitted he had been useful in the earlier ages, when animal life was more abundant, and the air was likely to be tainted with the effluvia of dead animals. But the farmer did not need such a scavenger now. Dead animals were exceedingly valuable for the compost heap, and he must be a very foolish cultivator who would allow them to waste unburied. He thought that the crows could all be killed off without interfering with the Divine purposes, according to which man has the responsibility of subduing nature, and ruling over it.

Jake Frink said he was against crows, and had been from the start. He never had been on more than one side of this question. They pulled up his corn whether it was tarred or not, and strings and scarecrows hadn't any more influence on 'em than on the wind. He had seen 'em light right on a stuffed man. He never had found but one thing to fix 'em, and that was corn soaked in New England rum. That made the creatures so drunk you could knock 'em over as easy as lame geese.

Seth Twiggs thought that was the best use neighbour Frink could put his rum to. If he kept it, he was greatly afraid that somebody besides the crows would become extinct. His opinion was that "carrion crow" expressed the character of the bird as well as his habits. He not only pulled up his corn, and bothered him to death with planting it again, but he destroyed the eggs and young birds in his orchard. He was a thievish, blood-thirsty fellow, ready to kill anything that has not strength enough to defend itself against his attacks. He knew a good many of the small birds lived mostly on insects, for he had watched them when feeding their young. He thought the crow destroyed the grub killers, instead of the grubs, and he was glad to see folks getting waked up to his true character. He should go strong for smoking him out.

You see which way the current is setting up here. Every crow thinks his own young the whitest, they say; and I am perhaps a little prejudiced in favour of Hookertown, but it strikes me that there is about as much good common sense in our Club as there is in any scientific society. I have to admit that I have been on both sides of this question, but have found hard bottom at last. Our fathers were right in killing crows. The birds belong to the fossil age. There is no music in his caw. He prefers a dead carcase to a living one, and will devour a ½ lb. of putrid flesh a-day. We can make a better use of the flesh than to bestow it on this sneaking thief. He destroys our song-birds and worm-eaters in the nest. He is the pest of our corn fields and the scourge of our orchards, where the farmer's true friends build their nests. A strong petition is going up to the Legislature from Hookertown this spring, for a big bounty on crows.—Yours to command,

TIMOTHY BUNKER, ESQ.

[On this occasion, our good friend, and usually humane correspondent, Timothy, appears to have been a little troubled with the bile; otherwise he would not have been so savage against the rook.—ED.]

The Garden.

GREENHOUSE CLIMBERS.

BOUGAINVILLEA GLABRA—LUCULIA GRATISSIMA.

MONG the most admired subjects of modern introduction—admirable in t every quality that goes to make a ar plant—stands Bougainvillea glabra. since the plant was brought so strik- I might almost say so sensationally, notice by the magnificent specimens of branches, clothed with flowers, exhibited years ago at South Kensington, by Mr els, gardener at Syncombe Hall, the ainvilleas, especially speciosa, splendens, glabra, have occupied a high niche in the le of Flora, and bravely do they bear honours they have so proudly won. r charming spikes, or rather branchlets, autiful and bright-coloured bracts are uced in such wonderful profusion, and lants are, withal, so cleanly in their habits simple in their necessities, as to render universal favourites, well worthy of a in every collection of plants, however t.

rhaps, strictly speaking, they ought to alled stove plants, and, as such, would a certain extent, out of place treated as house climbers. It is at least certain most of the varieties require, during a derable period of the year, an amount at which they could not receive in an ary greenhouse; but it has been proved glabra, at least, will grow in a warm rvatory, and not only grow, but flourish, produce its masses of mauve-coloured s in great abundance. To ensure this rth a little extra trouble on the part of ultivator who has no stove to fall back upon, in case of the unsatisfactory result of a cold damp season. Used as a greenhouse climber, it must have the warmest and sunniest part of the house assigned to it, if there is any choice of situation, and should be planted out in a prepared border, with, if it is possible to be had, a slight amount of bottom heat, and with that the result need not be feared. Rich, fibry, sandy loam, with the addition of a little leaf mould, will suit it well, and it will be found to thrive amazingly even in a conservatory, always providing that the wood be well ripened in the autumn months. One of the great peculiarities of the plant, and not its least recommendation, is its frequency and persistency in blooming. With every advantage, it may be had in bloom during six or seven months of the year; and although so much as this cannot be expected of it under disadvantageous circumstances, there will still be sufficient to reward abundantly the pains taken with it.

Another very fine plant for training against the walls of a conservatory, doubly useful, because flowering during the autumn and winter months, and adding, in its fragrant odour, another sweet attraction, appreciated by all who possess, even in a faint degree, the sense of smelling, is

LUCULIA GRATISSIMA.

Although by no means a new plant, it still remains, owing to the difficulty experienced in its propagation, one of the few soft-wooded plants which command a good commercial value. It has been considered by some

rather difficult of management. It certainly is so, in so far that it is a difficult matter to grow a well-proportioned good-looking plant of it on account of its leggy character. As it bears its great bunches of flowers on the tops of the season's growth, it is always apt to become long and lanky, and bare at the bottom unless the pruning-knife be applied to it with an unsparing hand; and even with that it is rather a rare sight to see well-managed plants of it. It may, however, by adopting liberal treatment in its diet, be easily grown with fine healthy shoots, which will bear splendid bunches of flowers during the dullest period of the year. It may be grown in bush form as well as on the wall, and must be planted in any situation where the atmosphere does not readily become parched to an exhaustive degree, and where it will not be subjected to currents of air, which have a most detrimental effect on the well-being of the plant.—*James Lorimer, Bradford.*

CLEMATIS JACKMANII AND ITS CONGENERS.

WHAT the Lapageria rosea is among greenhouse creepers, so is Clematis Jackmanii, in particular among perfectly hardy ones, "the Queen." Its large massive flowers of lovely violet purple, produced in lavish profusion for five months of the year, its vigorous constitution and growth, and its easy culture, to my mind fully warrants its claim to any position in the mansion, the villa, and the cot, where gay flowering creepers are desired. It appears to me unfortunate, for many of its congeners—pretty and effective though they be—that Jackmanii was in existence before them, for, taking many chief points into consideration, it bears the palm. Let not this deter any one from planting them, as well as the one which I have indicated as the queen.

These clematises, if I mistake not, will take a prominent place ere long in decorative gardening. It is not alone for walls, fences, and trellis work that they are most admirably adapted as embellishments; they are likewise splendid objects for arches, pillars, pyramids, and for rambling over rocks, rockeries, and also for beds. Their colours being distinct from the great majority of plants so used, make them all the more desirable. They are perfectly hardy, at least 30 degs. of frost does not injure them; and even should a severe frost cut them down to the surface of the ground, it is questionable if any harm be done, for they will spring from the earth with increased energy, and cover with their lovely flowers and foliage a large space for months the same season. Strange to say, that only one among many have suffered in this way last winter, and that was Jackmanii, while others were uninjured—in no better sheltered positions—by 29 deg. of frost. The one in question has, however, found its way to the top of a wall 14 feet high, and covered a large space with more magnificent blooms than any of the others; and this leads to the conclusion that these clematises should be hard cut-in every year, just as our fathers hacked away all the spray of Traveller's Joy to keep it within bounds. Rich soil and severe cutting down gives the finest crop of large flowers in the case of these clematises. They are "gross feeders," and when planted should have some well rotted manure mixed with the soil. They grow in ordinary garden soil, and any gardener need not regard them as plants leading to great trouble and preparation. The very reverse is the case; and therefore, as well as for their value, I recommend them to all who are about to plant hardy climbers.

GRAPE GROWING AT COMBE ABBEY.

EARLY ten years ago I planted a Barbarossa vine, now known as the Gros ıume, at the end of a large late vinery, ıg a rafter allotted to itself, in common other vines in the house, it being my tion to spur this vine after the same ıer as we do Black Hamburgs. It is owledged that, in pruning Hamburgs to the rod, small compact bunches are ed; farther from the base, the bunch be larger, but it loses proportionately ompactness. The Gros Guillaume I l to be impatient of close pruning. Findthe best bunches came from leading ts and run-away laterals, I loosed the and gave the vine its freedom, to the ıt of half of the adjoining light, cutting the half of a Victoria Hamburg to : room. The vine now occupies a ficial space of 120 feet of glass. The mference of the stem, 1 foot from the ıd, is 9 inches. No doubt, had I ed the vine to extend as it offered, and now, it might by this time have filled ntire house, which is 50 feet long by et wide. The third year after planting ine, it was allowed to carry 6 bunches, ıing, collectively, 42 lb.; and succeedears it was allowed to carry from 6 to 9 hes, averaging from 4 to 6 lb. per bunch. In 1869, 133 bunches were cut away, leaving only 9 to mature. This year, 1870, a similar number were cut away, leaving 18 bunches to mature, averaging from 4 to 7 lb. per bunch, or about 90 lb. of fruit. The bunches, taken collectively, would represent, at 12s. per lb., a commercial value of £54, a sum nearly equal to the produce of four milch cows, taking them at £15 each. Has Mr Mechi anything to equal this at Tiptree? The bunches now hanging are of a very good colour, and may be viewed by any one up to the beginning of January.

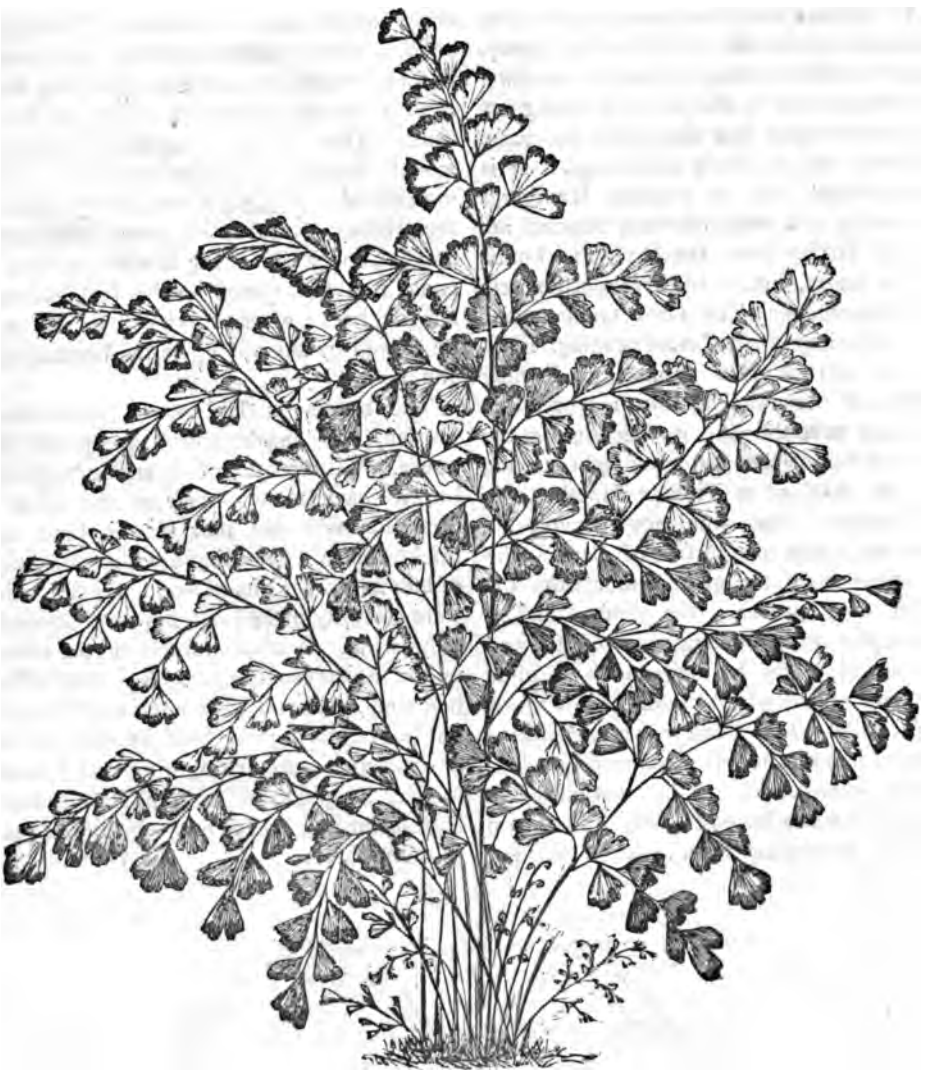
The border is laid on a well-drained bottom, half inside and half outside the house, and consists of a strong adhesive brown loam, mixed freely at the time of formation with old hair plaster, lime, and brick rubbish, containing a large per-centage of lath and other bits of wood, most of which were carefully picked out, but some unavoidably left in. A small portion of the sweepings of a blacksmith's shop was also added, including, of course, some horse-hoof parings; but from none of these have we ever suffered any inconvenience arising from that "horrid fungus," alleged to spring from such additions, if, unfortunately, these happen to form parts of the mixture.

NEW AND RARE PLANTS.

ADIANTUM RUBELLUM.

MAIDEN-HAIR FERNS have a wide geographical distribution. Here we one of the Capillus-veneris section, found ːru, and introduced by the Messrs Veitch, had it described. Like all others of family, it delights in a mild, moist ium. Even Capillus-veneris, or our native maiden-hair, enjoys a climate of that kind. Like the one with which it is associated, it perfects its fronds in autumn, and shortly thereafter begins, under the mild heat kept up in stoves, to push young fronds. Great care must be taken at this time not to deluge the plant with water, else it may die altogether, and more readily so, if any one

has it in a small state. These young fronds like many more of the genus, are roseate tinged as they unfold their pinnæ and brighten up the green—the normal form of fern life; hence the name *rubellum*. It will make a good plant for a Wardian case, or for any case in parlour or drawing-room gardening, where a little artificial heat is present. Being distinct, and cheap to buy, for a novelty, many of our readers, doubtless, will find space for it, and, if successful in cultivating it, be delighted with its presence, among the choicest of ferns.



Adiantum rubellum.

CROTON (CODIÆUM) UNDULATUM.

Among the many beautiful Crotons tha have been introduced from the South Se Islands by the late lamented indefatigabl collector, Mr John Gould Veitch, there i none that surpasses the subject of our prese illustration, for which we are again indebt to the courtesy of the Messrs Veitch. T one has more than the variety and pieb character of such beautiful sorts as pictu variegatum, and angustifolium; and th when we add to that, a dense habit and elegantly-formed leaf, we have characteris

go towards pointing to the plant in stion as one of the most ornamental ıge plants that could ever grace an exhi- ɔn table. But it is not only as an exhi- ɔn plant that we speak of it; it is equally as it shews a constitution equal, at least, in sufferance to C. variegatum, which has proved itself so valuable for resisting the fatigue of a dining-room and parlour climate. It grows freely in a stove temperature, and will go

Croton (Codiæum) undulatum.

ıble for stove decoration, and particularly n-door decoration, where plants of decided :t are so much in demand. That it pro- ɜs to take a front rank position in that ıcity we are fully warranted in believing, along all the faster if treated to bottom heat. The roots get encouraged by the extra warmth; and if moisture in plenty be provided in the atmosphere, it will have a tendency to keep down the propagation of such insects

thrip and spider, which are the greatest enemies to all fine foliage plants, pressed on by the means of artificial heat, and indeed to all plants of whatever kind. Only it is not a wise system to have too great heat during December and January. When February comes round, and brings with it lengthened light and increased sun-heat, then the temperature may be increased by day, keeping it always from 10 to 15 deg. lower at night.

The importance of attention to these particulars in laying a good constitution for all plants is not sufficiently understood, or, if so, not acted upon so generally as it ought.

The engraving faithfully represents the habit or general appearance of the plant. The leaves are oblong, acuminate, pale gr when in a young state, irregularly blotcl with yellow. When fully matured, the gro colour of the lower surface is as ruby as brown or purple beech. The upper surf is of a much darker hue,—a sort of shad blackish red. The golden spots by this t have changed to the colour of red lead, lighten up the surface to an extraordin brilliancy. In gas-light this is particul distinguishable; and when taken, toge with a well-formed style of growth, and leaves entire but undulated so gracefu we have no hesitation in pronouncing it one of the first decorative plants of its t suitable for all who have either stove or in mediate heat at their command.

CHEAP CONSERVATORIES AND HOTHOUSES.

WE have so many inquiries about cheap hothouses, that, in addition to those we have formerly recommended, we present several erected by Hereman & Morton. That firm carried out the designs of the late Sir Joseph Paxton, who was ardent in his zeal and untiring in his devotion to the spread of a horticultural taste among the masses. As a garden architect, he took the very foremost place, not only sketching and carrying out the great houses at Chatsworth and elsewhere, but eventually was fortunate enough to conceive and sketch the only feasible plan of covering the art treasures of the earth, *pro tempore*, in that great palace of glass in 1851. It was, in a great measure, to his early notion of "hothouses for the million," after the abolition of the duty on glass, that an impetus was given to hothouse building throughout the country. Hothouse building then was too expensive for even moderately wealthy people to indulge in; and many, therefore, hailed Sir Joseph Paxton and Mr Rivers's cheap houses as a boon for growing fruit or cultivating flowers. It i easy to erect a costly house that will l something of as permanent a characte wood and glass can make it; but to ha very cheap house that will be stable and be offensive to the eye, is the desidera Thousands are interested in this, and firm or firms who can do this best cheapest, will have the orders to ex without a doubt.

Fig. 1 shews the skeleton or sectio a span-roofed house that has brick about 3 feet high, sloping sashes to together at top, and a plain hood to t water over the peak of the angle. ventilating medium will be best see fig. 2, where the slope is so fitted hinges that the sash can be opened li door; and as many of these can be vided as is necessary for the kind of ve tion required. This is the cheapest doing away with the provision ren necessary for the one sash sliding ove top of the other. It also saves the

ke span, as may be seen in fig. 3, house, ornamental in its character and useful
lds considerably to the expense of in its end, this is the house; but it must be
ion of any plant or fruit house; and, understood that it is erected upon economic
ımends itself to all, it provides as principles, and is not of high architectural
limate as a more expensive house. merit.
; adapted for plants, as the side Then, again, if there were a common
re stages over the hot-water pipes boundary wall between villa properties, it might be utilized with such a house as fig. 2 represents. This is the cheapest form of all houses having a semi-back span, thereby affording elevation suitable for vine or peach-growing, and a little of plant-growing at the same time. The surface here presented for viticulture is great, and therefore we recommend this, with the abundance of light which is thrown in from all sides, notwithstanding the opaque wall, as one of the best and cheapest fruit-houses of a permanent character that could be erected.

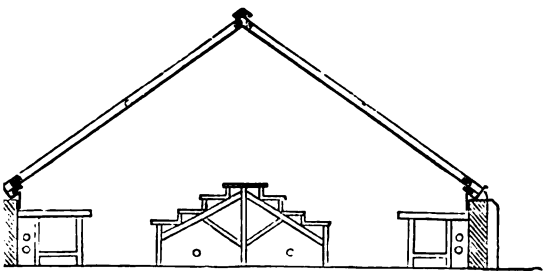


Fig. 1.—Design for Span-roofed Plant House.

v. As an accommodating medium
; of all kinds, and bedding plants in
', there is no better style of house

ıore expensive erection be wanted, A cheaper style of the same character is
e span-roofed house fig. 3 will engraved on fig. 3. Here the sashes run up to the cope of the wall, and ventilation is arranged for on the sloping sectional principle. There is nothing cheaper than this in the market, except Rendle's Protectors, which are reared or pulled down like a hut at pleasure. In Hereman & Morton's designs, as here engraved, there are no fixtures—all can be taken down at will, like any other furniture in the house, and this is of great importance where tenancy reigns.

This will do for tall conservatory

Fig. 2.—Design for Fruit or Pla H

l climbers, such as have been recom-
ɔy Mr Lorimer, and for plants in
It will be more lasting than
. 1 or 2, because of the principal
ng fixtures. The ventilation here
:e at the two perpendiculars, and at
n top. For such as want a good

Fig. 4 is quite the suitable adjunct to our town villas. It is a little more costly than the general service houses above noticed; but for filling up an important niche—the recess of two abutting wings—there is nothing we know of more suitable. There is some

design about it to please the fastidious eye, and then for purposes of receiving and growing all kinds of plants suitable for town

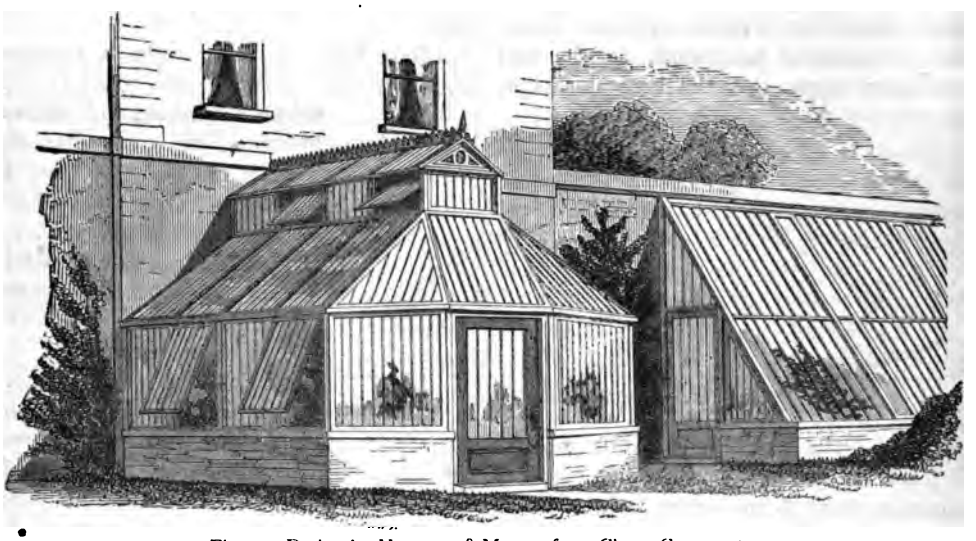


Fig. 3.—Design by Hereman & Morton for a Cheap Conservatory.

culture, it is quite good enough. Its perpendicular front is lofty, and must of necessity

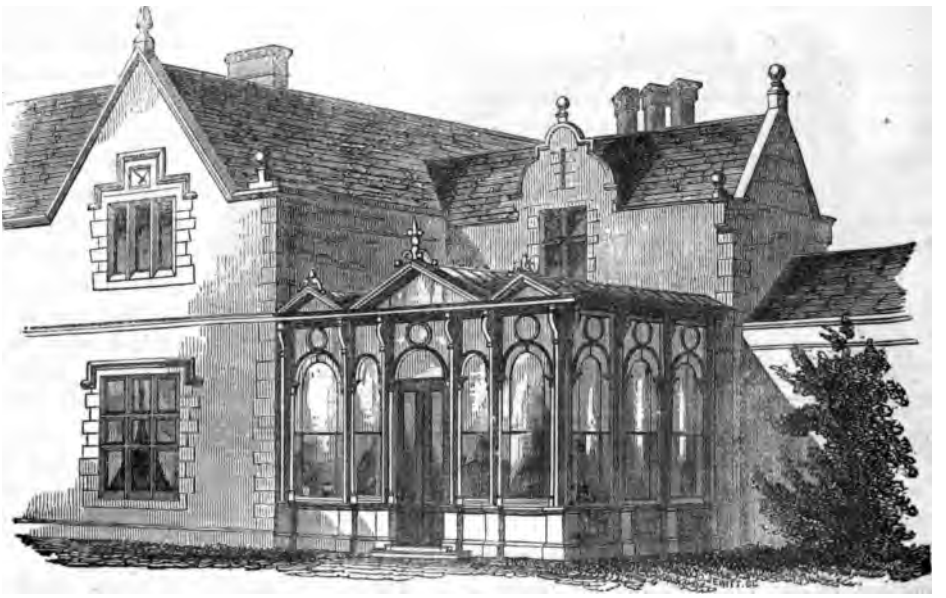


Fig. 4. —Conservatory as an adjunct to a Town Villa.

be so for appearance sake; but the climbers will do well if trained up the rafters and led along the crossbeam that forms the basis for

the three spans or ridge, and for the roof to spring from. We have thus presented what may be suitable structures to many of our readers, and we shall revert more fully to some of the details in a future number, shewing how houses of the kind can be cheaply heated, and how the internal erections and fittings ought to be done.

Work in the Garden during January.

From "THE VILLA GARDENER."

ɔssible to forget that this month is the the year. The work must linger for a le we wish every reader a Happy New ng journeyed together for nine months, y salutation is not a matter of mere form, greeting between friends, for it is thus l recognize every writer for and reader A GARDENER. Many of the latter can it year that—

ght them a friend, and a true true guide,
w Year will *not* take him away."

rth of a year is suggestive. It calls up draws aside, as it were, the veil that re. We seem to look further back, and forward than usual on the threshold of is very needful to do both in horticulture. ɔ breaks in our stream of life. The future are ever linked together in the in an endless chain that only exhibits to a time; that single link is the present. , the brightness, the happiness, the present, are inseparably bound up with gone before and with much that will Hence the immense cultural importance ɔn and retrospection. The old year is are not done with it. It was a seed time reapings in 1871 will mostly be measured gs in 1870. I trust it was a gladsome f us; doubtless it was sad to some, but gone, it seems a dear old year to us all. ting with an old, a very dear old friend, e to it, but it must be done. Welcome eed the parting guest!

New Year to all readers of THE VILLA On, forward, march into the future—with strong hand, and truthful heart. The been, in many respects and in many ticultural triumph. The sun has done er the earth with plenty, and enwreath

A new guide has given you his hand n to success in your garden. You are er acquainted with each other. If the l too high up beyond your reach, please they will reach lower, until every one himself or herself how to tend his or If too low down, they can instantly be her level. We wish villa gardening to best and most perfect kind. The late Mr s contended that it required more skill mall garden than a large one. Perhaps he was right; at all events it requires great skill to make the most and best of any garden large or small. Our aim (we may fail in it, for it is ambitious) is to make THE VILLA GARDENER the medium of conveying this skill to the thousands who need it, and to present it in such form that all may read, mark, learn, inwardly digest, and successfully practise it for themselves.

Here is the new year spread out before us like a large roll of clean paper, there is neither finger post nor guide upon it as yet. It is clean without and within. We purpose unrolling it month by month, and writing directions, plain, simple, and precise, so that those who know nothing of gardening may know much, and those who know much may learn more, to the intent that every garden, large or small, may seem to its possessor such a thing of beauty as to become a joy for ever.

A happy New Year! We have entered upon the living present. "Let the dead past bury its dead." Only our dead are not dead, they but sleep. Cradled in storm, fettered with frozen chains, covered with snow-drifts, they sleep on, and take their rest. But there are bright eyes watching over their beds. The golden aconites, the drooping snowdrop, the sweet violet, the brave anemones, and other children of the wintry winds, keep their cold vigils over the sleeping flowers; and when they close their eyes, others take their place to keep watch and ward over all, until the joyful voice of spring is heard, calling all forth from their beds to a resurrection of beauty and glory. Until that time comes, it is ours to work and wait in faith, nothing doubting that each of the sleeping beauties will arise in due time, all the sweeter, the stronger, and the brighter for their long rest.

We talk about the death of the year and the death of plants in winter; but Time and Nature never die. Over the graves of our loved ones in the garden, as elsewhere, "Not dead but sleepeth," is the true inscription, and love is ever on its way, with swift and hurried footsteps, with the assurance, "I go that I may awake them." With such thoughts, let us enter upon our garden work for the new year. They will sweeten toil, refine and ennoble our minds, make us feel that the ground is holy, and cause us to tread it reverently, and to handle plants tenderly, lovingly, gently, as we would a sleeping infant. Depend upon it, such considerate treatment will not lose its reward. Plants will only yield up all their treasures of fragrance and beauty to skilful and loving hands.

KITCHEN GARDEN.

Complete all the work prescribed last month. If possible, the old year's work should be ended with the year. "Let the dead year bury its dead work," is a capital motto; but, like many other sententious sayings, it is not always possible to fulfil them in our practice. But arrears of work are very trying and discouraging in gardening, and special efforts ought to be made to bring them up at once. The sweets of gardening pursuits are greatly marred, if not actually turned into sourness, when work drives us. We then become the slaves of circumstances, instead of their master, as every gardener ought to be—must be—if he is to be successful, or his work is to become a pleasure. But gardening operations must be performed orderly if we are to escape the pitiful state of abject slavery, of complete subjection to works *that must be done at once*, which ought to have been done long before. We must take time promptly by the forelock, and drive our duties manfully—may I not add, womanfully—before us. Thus will the new year's gardening prove a delightful relaxation, and yield up to us a full revenue of purest pleasure. More than half of the success of gardening springs from doing everything at the right time. The other half comes of doing things in a proper manner, and placing things in the best places. In our instructions we will endeavour to keep these all in mind; and if our readers will do likewise, we trust their garden will not only prosper, but that the work in them will constitute one of their chief delights. In assessing the value of gardens, the many hours of happiness and healthful recreation they bring, are too often left out of the account. These, however, are of far more value to many than all else. Fresh grown vegetables, clean, tender, and crisp; fruit, luscious and sweet; and flowers grown at home fragrant and beautiful, are boons of the highest order, but the thought, the labour, and the love bestowed upon them exceed and transcend all. To this labour we must lead you now, though frost may threaten to make you a frozen-out gardener, and the hail may be battering your window, and the snow softly stealing, on silent foot, to throw its downy mantle over, and thus hide up all your garden. But no weather can long arrest all garden operations. The frost makes a cheap, almost frictionless tramway for heavily-laden wheelbarrows of compost or manure, and the snow brings work with it. Put on your thick boots, and attack it on tree and bush with a pole, if you wish to preserve them from being broken by its weight. We have known ladies, high and tenderly bred, make this their special task after any fall of snow. Then the snow on the walks and roads invite the whisk of broom or thrust of shovel to send it scampering away. Such labours are capital *constitutionals*, and the pleasure of walking on bright gravel between snow walks is a delight only to be thoroughly enjoyed by those who have taken part in removing it.

In small kitchen gardens it is a good plan to get rid of the snow altogether from among growing crops, such as kale, Brussels sprouts, celery, parsley, winter spinach, or any other vegetable that may be required in winter. The pleasure of clean and ready access to crops in use is very great, and is worth more than the labour of removal. In fact, the labour is often the greatest pleasure of all; for just as every child is happy if it can have a wooden spade and a small wheelbarrow to move sand about upon the beech, so I never yet knew man, woman, or child who did not delight in this transportation of snow from one place to another. Therefore, when the garden is small, out with it at once. The advantages and comfort will far outweigh any supposed manurial or protective property of the snow.

See to the *protection* of celery, globe, artichokes, parsley, lettuce, cauliflower, &c. In severe weather a little litter over the top is the best means of covering for the two former. For the others there is no protection equal to that afforded by Rendle's plant protectors. In ordinary weather they are efficient of themselves; when it becomes very severe, a little litter or a few boughs of evergreen may be placed over the glass tops, and a lining of long dung against the sides. This will render them completely frost proof.

Asparagus beds should have the old soil carefully raked off, and a top-dressing of half-rotted farmyard manure from 4 to 6 inches thick put on.

Roots of asparagus, seakale, and rhubarb may still be taken up in succession, once a month or so, for bringing on in a gentle heat, as directed last year.

Brocoli, especially the Walcheren, or any early varieties, must be carefully watched, and as soon as they are nearly fit for table, and before the central leaves open, they should be taken up, and placed in a cellar or any place of safety, to keep until used. The flowers are easily injured by frost, so much so, that if only slightly frozen in a wet state, they are ruined.

Potatoes, *carrots*, *parsnips*, *onions*, and all roots in store, should be frequently examined, to guard against decay, and ensure safe keeping. If either are stored in pits, see that the earth, or covering over the earth, of straw, fern, or other litter, is frost proof.

Cropping.—Guard the peas and broad beans, which ought to have been sown in November, against vermin, and slightly protect them either with the shelter of spruce boughs or Rendle's protectors from very severe weather. Another sowing of these might be made during this month.

The best mode is to throw up a ridge from 1 foot to 18 inches in height, and slope the face of it to the south. Then, about midway from the top of this southern side, sow the pea, or plant the bean in a slit or drill about 2 inches deep. The advantages are, that the seed has a warm and dry bed, and that the plants, when they begin to grow, have this shelter of

netrable barrier of earth on their northern side.
; plant early potatoes in the same manner, and
;e makes the difference of three weeks or a
n the time of ripening. For dwarf peas, such
Thumb, the ridges should not be more than
:s or 2 feet asunder. For taller, such as First
rom 3 to 4 feet are the best distances. In this
s a good plan to put a row of early Mazagan
etween each row of peas.

ve should be placed thickly under cover, to
and preserve. Succession crops to be pushed
l, or protected under protectors.

ces require similar treatment. More care should,
:r, be given to advancing crops. A few seeds
: of the best cos varieties should also be sown,
s the Brown cos, White Paris cos, or any
te variety, under glass. No garden should
: without lettuce, and to maintain a constant
, frequent sowings are indispensable.

w *carrots* and *radishes* might likewise be sown
protectors, frames, or hand lights, or in a warm
spot out of doors. But the chances of success
eatly depend upon the weather, and unless the
: placed under glass there is a great probability
ıot growing, or of the young plants being frost

frosted leaves of vegetables should be instantly
:d, dead cabbage or used brocoli plants taken
and scrupulous cleanliness preserved. Weeds
mes grow apace in winter. In dry weather the
ould be run through cabbage and other growing
and every appearance of weeds be instantly up-
and destroyed.

vacant ground must be at once digged or
ed, so as to expose as large a surface as possible
ameliorating influence of the atmosphere. The
s God's plough—penetrating, cleaving every
ınd the air enriches as well as fines down the
into the most fruitful tilths. Every atom of
land represents a loss of so much growing force.
ization quickens the earth into fertility, as well
ıks it down into mould. Let the rules, there-
:—dig early, dig deeply, and leave the surface
gh as possible.

THE FRUIT GARDEN.

; ought to be a leisure month in this depart-

The planting of fruit trees should have been
eted in November. They will succeed tolerably
n December. January is almost the worst
ı in the year for planting, and if it could
: done in the two last months of the year, it
often be wiser to defer planting till Feb-

But the weather very often takes these
:s into its own hands. January is mostly a dry
month. The frost may not be hard enough to
he ground very firm. But frost in the air or in
ind is well nigh fatal to the roots. To take
ıut of the comparatively warm ground, and ex-
pose them to a keen biting air, is like taking a man out of bed and setting him naked in the teeth of a nor'-easter. A death chill would almost inevitably ensue. However hardy the tops of plants are, their roots are invariably tender when removed from their natural positions. To expose roots to the air is just as unnatural as to bury tops in the ground. Either would end in weakness, disease, and death. It is important to bear this in mind at all times, but especially now, if circumstances compel any one to plant in January. Let out of the earth, into the earth, be your sharp maxim if you would command success. Do not plant with a frosty air abroad. Wait till noon, when the sun may have ameliorated the air. Or, if no sun shines, wait for weeks rather than let frost, with its keen edge, bite the life out of your roots.

With care and attention to all these points, peaches, nectarines, apricots, cherries, apples, pears, plums, &c., may be planted. I say *may*, but they ought not Two months earlier they must have done well—e now they may—and that is all that any one can a with certainty. The same rules apply to the spring planting of raspberries, gooseberries, and currants. In all winter or spring planting, extra precautions should be used in staking, mulching, watering, &c. With extra care and extraordinary skill, success is pretty sure at most seasons. But my object here is to counsel that course which, in ordinary hands, is likely to ensure growth, and hence my determined advocacy of autumn planting.

Neither is January, as a rule, a favourable month for these operations, weather, &c., being the same. I stated last month, that each month was better than the preceding one in regular rotation; but the weather and character of the month make a wonderful difference. Probably, taking the run of seasons, February planting is better than January, and April than March. I have already said that January is mostly a dry, frosty month, but March is harshness itself run to seed. Such states of weather must be shunned, irrespective to a great extent of time.

Proceed with the *pruning* of all fruit trees, beginning at the hardiest, and leaving apricots and peaches till the last. Late pruning always results in late flowering, and late flowering means a crop. Such trees, with the exception of vines, and in the case of removing large branches, which ought never to be done except early in the autumn, bleed but little, so that they hardly suffer from late pruning. True, a little vigour is lost; but better lose a little growing force than a crop by John Frost's cold grip.

Grape vines should be pruned at once; the sooner the better after the leaf falls. The wounds are long of healing, and the sap comes up with such a rush that there is apt to be a dangerous sacrifice of force from bleeding. These are generally treated on the spur system, that is, one bud, or at most two, are left at the base of every growing branch. Save all young wood intended for scions. Lay it in by the heels in a

sheltered place, out of the wind and beyond the exciting power of the sun. Success very much depends upon the safe keeping of the scions. The more dormant they can be kept, if until next March, the more surely they will grow. Many, also, head back the trees or branches intended to be grafted next spring, at this season. I doubt the wisdom of cutting so soon. Better, at least, leave one small portion of the stock above the intended splicing place, to draw up the sap, so that the newly inserted scion may find a full dish to dip its hungry mouth into when it enters its new home. Full instructions will be given about grafting before the period for it arrives.

Make cuttings of gooseberries and currants from 1 foot to 18 inches long. Place them firmly in rows, about 3 inches into the ground, 6 inches between the cuttings, and 18 inches to 2 feet from row to row. Some pick out all the buds but two or three of the uppermost. It is best to leave all, unless on the buried portion of the cutting. As each bud breaks into leaf, it helps to form roots by sending a portion o organizable matter downwards, or appealing urgently for supplies for itself. Either way, a quickening power is sent rootwards. As soon as roots are formed, and the normal condition of things re-established, proceed to rub off all shoots but those needed to form the bush.

Strawberries may still be mulched, if not already done. Neither cut off the leaves, nor dig, nor fork between the rows; merely break the surface with a hoe, and follow with a layer of good dung, full of juice, but littery. By the time the fruits are ripe, the bleached straw will form a clean bed for them to rest upon, far above the earthy particles that would otherwise be dashed into their delicate texture with every rain.

Old fruit tree stems may now be scraped clean, and dressed with a mixture of lime and cow dung to nourish, some think, but certainly to clean them by ringing out the death knell of clinging lichens and insinuating fungus. This varnish will bury alive or smother to death a host of minute insects. If the glow of the paint makes the old tree stems rather garish, it can be toned down to order with soot. But most of those who adopt this plan seem to think the whiter the better. They appear to say to all the world, behold how cleanly we are! We even whitewash the outside of our trees.

Fruit Stores.—Examine all fruits as they come in season, handle carefully, and remove every specked sample. Most pears come before their time; occasionally, however, it is otherwise, and such pears as Vicar of Winkfield, Rance, and Easter Beurre, are immensely improved by being placed for a week or so in a warm dry atmosphere before being eaten. Of course they are allowed to cool down again before they are brought to table, as luke-warm fruits are detestable. Winter Nelis, on the contrary, is always good alike, I had almost written. The fact is, it is constantly so excellent that, the degrees of quality, if it has any, are lost to taste in its superb, juicy, satisfying richness and fulness of flavour. Apples may be hastened to maturity in the same manner; the Ribston pippin being especially susceptible of improvement from the warm air treatment.

All bush fruits may still be mulched, and have the manure slightly forked in. But on no account should the ground around fruit-bearing bushes be dug. No surer receipt could be given for undermining the constitution of gooseberries and currants and shortening their lives, than the old practice of digging deeply around or among them every winter.

THE FLOWER GARDEN.

Ground work, as it is called, may still be pushed forward in this department. Under this head is included all alterations of surface and changes in the form of flower-beds, or the direction of walks, new plantations of trees or shrubs, fresh turfing of ground or edging of walks, the making of new walks or roads, trenching, draining, &c. All such work is best done in the autumn, but circumstances often compel us to do much of it in the winter and spring. There is this advantage,—that the days are longer, and more work can be got through in a January than a November day. Where ground has to be moved to any great depth, even the frost need not hinder the progress of ground work, as the surface can be picked up, or, better still, prevented from being frozen, by a covering of long stable dung. In the working, this is raked off, and the surface can be moved at once with the spade. Advantage should likewise be taken of the frost to do all needful wheeling of earth or of composts over walks or turf. If over the latter, the track must be frequently varied, and it is better not to wheel over grass when severely frozen or covered with thick hoar frost, as the wheel of the barrow breaks the grass short off by the ground, and cuts up the lawn into black tracks of decayed or dead grass. These black lines have an untidy appearance, and occasionally the grass so bruised and broken in a frozen state utterly dies, and leaves serried lines to disfigure the turf throughout the whole of the succeeding season. These evils may be greatly modified by laying boards a foot wide over the turf; and if these are laid down over night, the grass will not be frozen beneath them, and no injury can be done by wheeling over it. But in all cases, walks and roads should be taken advantage of, as far as they go, to wheel upon, as if these are properly made and kept, wheeling over them in frosty weather will do no injury whatever. On the contrary, it will prove a sort of supplementary rolling, which will help to consolidate and smooth them, provided the wheeling is pretty evenly distributed over the entire surface of the walk. Few things, however, are more common, none can well be more unsightly or injurious than to see one portion of a road or walk

l into a sort of iron tramway—hard, smooth, sy, by the constant pressure and grinding of barrow wheels, when all the other parts n left unused. Even in frosty weather, each the walk should be made to carry its own and then no injury, but a positive good, will by our wheeling. Frosty weather is not time for wheeling, but carting. All soil, compost, and gravel, should be moved over roads either during frosty or dry weather. If d at once, get them as near the spot where l be wanted as possible. The frost will thus a labour-saving expedient of the highest nd the trouble, vexation, and expense saved eling or cutting only during dry or frosty are incalculable.

is a good time to trench and thoroughly clean und in the flower garden or pleasure ground d for the growth of trees or shrubs. As these manent crops, the preparation for them cannot thorough and good. It ought to be trenched pth of from 18 inches to 2 feet, and, if poor, d with some good compost or the addition of tted manure, at the rate of a barrow-load per All weeds and old roots should be carefully out and the ground left clean and sweet for the d crop. If water is found stagnant at this it must be drained off; and drains are of little eath trees and shrubs unless they range from feet in depth. If nearer the surface, the roots perish as they dip into the stagnant water, or ins get blocked up with the roots. Nearly all eem to have a taste for drains. They find them ly as the vulture scents carrion. And no sooner roots find drains than they enter in and possess vith an impermeable net-work of fibres.

s may still be planted in deep soil. Rich manure clay bottom for their toes to burrow in, are the tions of success in rose-growing. To these may led a winter mulching of rich, juicy dung, from inches thick. Weak roses may now be pruned. eaker they are, the closer they should be cut on the principle that concentration of force is —strength. Roses wanted to flower early, also be pruned at once. But the pruning of neral stock to flower towards the end of June or ing of July had better remain undone till the next month or March.

pruning of all deciduous shrubs should be pro- l with. Climbing roses, excepting tea roses, es, clematises, &c., should now be attended to, e plants be neatly and tastefully trained. Haw- beech, privet, or other hedges, if not cut in the n, should be trimmed now. The best form for lges is that of a wedge, with the narrow point ds. Every portion of such a hedge, from twiggy netbermost branch, is washed by the rains and hed by the dew, and thus preserved in perfect . The growth of all hedges, especially young ones, is hastened very much by clearing their bottoms of all weeds, grass, or other rubbish. If we take care of the bottoms of hedge plants, the tops will generally take care of themselves.

Cultural directions.—During severe frosts, we can do little or nothing in this line. Favourite tulips, lilies, anemones, and hyacinths should be protected either with mats or a few inches of coco-nut fibre on the surface from very severe frosts. Beds, enriched with old cow-dung and leaf mould should be prepared for planting ranunculuses. During thaws, especially if they have been rapid, a good deal of attention will be needed. Many of the autumn planted flowers, such as violets, forget-me-nots, arabises, aubrietias, daisies, pinks, carnations, heart's-ease, primulas, polyanthuses, dwarf phloxes, and many bulbs will be half lifted out of the ground. These must be firmly pressed down with the hand, and the fine mould put kindly around them. As soon as the soil is sufficiently dry, the surface should be hoed between all spring flowers. This seems to quicken the growing force of the ground, and to give the weaker flowers a fresh start.

Routine work.—Sweep and roll turf and gravel, and turn the surface of old walks if the gravel is deep enough. This is easily done after frost. The spade is used as in pointing the ground. It is thrust in one, two, or three inches, according to the depth of the gravel, and then moved along horizontally the length of the spade. The spadeful of gravel is then inverted, and a clean fresh surface equal to new is the result. Of course, it is raked and rolled as in the making of new walks, or the top-dressing of old ones. The grass by the side of walks should now be heavily rolled or rammed down, leaving it only about half-an-inch above the gravel. It should then be cut quite straight down with a sharp edging knife. If there is little beauty in the garden this month, let us do our best to make up for the lack of it by scrupulous care and the highest keeping, to which nothing contributes more than bright, dry, smooth, clean walks and cared-for edgings. These, with smooth green turf, give a pleasing charm to a flower-garden, large or small, even under the bare boughs of naked, dreary winter.

PITS AND FRAMES.

Keep the frost out by lining the sides with long dung, and covering the surface of the glass with mats and straw or reed covers. For the wintering of such plants as pinks, carnations, picotees, polyanthuses, auriculas, no artificial heat is needed. It is a difficult matter to keep cinerarias, herbaceous calceolarias, pelargoniums, or even verbenas, in these structures throughout the winter without heat by fire or manure. Heated or not, plants in these structures require great care during severe weather. They must be watered early in the day, so that the sun or air may dry the surface of the soil before night. The leaves should not be wetted at all at this season. If the

weather is frosty, abundance of air should be admitted to the plant when it is not freezing outside.

Some grow potatoes, radishes, carrots, cucumbers, melons, in such structures. For the first three, a start should now be made. Leaves, tan, or a small quantity of hot dung will give the requisite heat for the former. As soon as the heat begins to come through, place about a foot of light soil on to the top, and plant the potatoes and sow the seeds at once. Give air on all mild days, and beware of drawing up the plants weak and puny in their early stages. Exclude frost and all cold under 40 or 45 degrees.

THE GLASS-HOUSE FOR PLANTS.

Maintain a temperature not under 40 degrees by night, nor 50 degrees by day. It is safest to keep all the plants in a state of semi-repose. There is great danger in unduly exciting plants at this early season of the year. Two months of cold weather, perhaps more, are pretty sure to come after January, and excessive growth now will prove a source of danger for all that long period of time. Even camellias do not require much heat, and most of the plants will keep longer in flower in a cool temperature. Great precautions must be taken against an excess of moisture. Moist air spots and ruins camellia blossoms, and is injurious to most other flowers. No water must be spilt about nor splashed on the leaves, and all the water needed by the plants should be given in the morning. Fresh air should be given as often as possible, that is, when the outside thermometer is above 40 deg. During dull weather extra fire should be used in the day time, to enable a change of air to be effected without chilling the plants. This should be done by opening the highest part of the house, or the upper sashes, for a short time. In bright weather the sun has generally sufficient power to permit a little air to be admitted. The great evil to avoid is a stagnant, plant-sick atmosphere. This must be got rid off at almost any price short of the admission of frosty air, or a cutting draught from the boreal north or biting east.

Hardwooded plants, such as heaths, epacrises, correas, &c., should be placed in the coldest part of the house, though it is a mistake to suppose that these, or, indeed, any plants whatever, enjoy draughts. They do not. There is no natural position so trying as the placing of plants in a cutting draught, between the outside temperature and a different and higher one inside.

Softwood plants, such as pelargoniums, again will be growing more or less, and must be put in the warmest part of the house, close to the glass. It is important that they should neither be starved nor drawn. These, with cinerarias in flower, and herbaceous calceolarias growing fast, will need more water than any other plants in the house, unless it be the large-leaved arums. The faster plants grow, the more water, as a rule, they require. Chinese primroses, especially the double varieties, seem an exception to this rule. They, however, can dispose of a fair amount of water, if it is kept out of their centre, and the axils of their leaves. In either of these it means decomposition and death to these beautiful plants.

Fuchsias should have a good share of light, with a little water; when thus encouraged, they break out into leaf.

Bulbs, such as hyacinths, narcissuses, and crocuses, should be placed in the warmest, most sheltered, and shady positions. A few snow-drops, golden aconites, &c., should find a place under glass at this season, to anticipate the spring, by a month or six weeks. If bedding plants are stored here, keep them at rest until February, unless any of them are specially needed for stock, when they must have the best growing places. Keep the plants scrupulously clean, by fumigating with tobacco as soon as any fly makes its appearance. Remove any dead leaves.

Cut down chrysanthemums, and remove them into a pit or to a sheltered place out of doors, or throw them away, first, however, inserting cuttings for next year's stock of plants. Scrub pots, shelves, floor, and see that every plant rings the new year in, in a clean, healthy state, and with all its accompaniments in harmony with its condition. Full half of the success, and more than half the pleasures of gardening, springs from cleanliness. "Without spot," should be the inscription on every glass-house for plants, and on each of its occupants, if our success is to be full measure, pressed down, and running over.

THE VINERY.

Yes, we must have a vinery. Every villa resident may have one. They range from 5s. to £50, and therefore are within reach of all. Mr Rendle offers a complete miniature vinery for the former sum, and Mr Beard offers a splendid indestructible house of iron and glass for much less than the latter. And vines are almost as easily grown as cabbage plants. True, we don't always reach perfection in vine culture. But what, then? Who ever does reach perfection in anything? If we waited for that we should never try. Directions will be found in other parts of THE VILLA GARDENER for the erection of villa vineries, the making of vine borders, &c. In this department we must assume that the house is up and furnished, and fruiting vines planted. It would try our readers' patience too much to wait a whole year while their vines grew. Well, here are the vines ready. But I won't have them started yet. If your house is new, rest on your oars till next month. It is wise for villa gardeners, with only one vinery not to start it till February. But if your vinery is old, to work at once, and scrub every nook and cranny, every inch of the wood work with soap and warm water. Before doing so, however, give the glass and the vines a hot bath. Dash water at a temperature of 130 degs. resolutely against

m. This will clean both, and kill most insects that y be lurking about. Glass ought not to be washed h soap-suds. The chemical action of the soap is to injure and discolour the glass. Having scrubbed wood-work, and whitewashed the walls, proceed paint the house over with a paint compounded of ıal parts sulphur, loam, lime, and cow dung, with acco water in lieu of oil. This forms a nauseous velope to smother prying insects with, and to warn siders off. Don't peel or rend off the loose bark. forms a good holdfast for the paint, and assists to ep the growing vines moist and warm. Having ıs prepared all, mounted the box, as it were, whip hand, to drive you home ripe grape-wards, I call out ıdly to stop till next month. You will save coals, sen the risk of failure, and lose but little time by ing so.

THE ORCHARD HOUSE.

After the loud and fervent appeal, pages 371 and 2, we must add an orchard house to our other work the month.

Well ! it is even easier managed than a vinery, and for cheapness, nothing can exceed it in the way of ıses. The sides may be of wood, or earth even, glass—there is no roof so cheap as glass. And management we intend to make so simple that any lady or gentleman may succeed in growing fruit trees under glass, either out or in pots.

In January, if the work was brought up in the autumn, there is nothing to do but to walk through and admire your dormant trees, and to note that neither birds nor insects prey upon the fat, plump buds. It is also well to preserve the roots from the frost. This is easily done by a layer of useless hay, straw, or other litter. But the best material is rough coco-nut fibre refuse. The trees, if in pots, may also require one good watering at the roots. Excessive drought in the dormant season may mean poor or dropping buds in the spring. The trees may also be painted over with any sticky, simple mixture of earth, soot, lime, or cow-dung, to smother any lurking insects that may be present, and to warn off any that might have a fancy to feed on fruit or flower buds when they become more tender. Give all the air possible on mild and sunny days. January treatment ought to be such that no difference will be seen in the trees between the 1st of January and the 1st of February. Of course, I am writing only of orchard houses, which have no fire heat applied to them. The great secret of success in these is not to excite the trees too early, so that they may not be subjected to any check after they have started into growth. To this end keep strictly to the *status quo* for the month.

Arboriculture.

MODE OF CONDUCTING A REGISTER FOR FORESTERS.

BY JAMES KAY, FORESTER AND HEDGER, BUTE ESTATE, ROTHESAY.

IN discussing the advantages to be derived from an established Register for Foresters in connexion with the Scottish Arboricultural Society, there are various things which may be adverted to, that are more or less connected with the advancement of such an object.

The Society in its present isolated position is quite powerless in promoting the interests of its members any further than individual effort is concerned. No doubt a Society in its first efforts cannot claim confidence till once it has given evidence of being worthy; but without doubt the time has come when it must be conducted on more extended principles, both for the advantage of its members, and of landed proprietors generally.

Therefore, in order to render it more advantageous, it must be placed on a more liberal and practical basis. True, as an institution for practical forestry, its papers will testify what its members are capable of; still, in these days of science and art, it becomes necessary to have it placed on a corresponding footing with other institutions, both in regard to management and scientific research, so as to be able to account for the nature of cause and effect on sound scientific principles; and shew to the world that it is a Society worthy of its name, and give members and landed proprietors an opportunity of availing themselves of the advantages to be derived from it. Some may say, What has Arboriculture to do with Science, or Science with Arboriculture? The fact is, there are few, if any, of the sciences but are connected with Arboriculture, for Geology may be termed its foundation—climate, its effects. Botany classifies and arranges the productions of the vegetable kingdom. Chemistry analyzes its productions and producers. Therefore, these subjects should be made part of the practical education and examination in becoming a candidate for a forester's situation. It may not be possible to put the Society on such working ground all at once, but these should be its objects at the earliest opportunity, and, without doubt, the advantages would be great, for it would raise the status of the Society to its most practical and useful results; and would, likewise, be a great advantage to proprietors and others requiring head-foresters and wood managers, if conducted on practical and impartial principles, which ought to be the aim and object of such an Association, so as to give proprietors confidence in being supplied with properly qualified men, and that a qualified man may have an opportunity of advancing his abilities. And in order to have it carried to a successful issue, I would propose that the following conditions be adopted, viz., a Committee or Board of Examiners, appointed by the Society, for interrogating intending foresters, and a register for such as have passed a successful examination on the different subjects connected with Forestry.

The Board of Examiners to consist of seven members of the Society (not less than five of whom must be present at the examinations), who are known to be thoroughly qualified as botanists or practical foresters, and possessed of a good English education; and for a more practical examination in regard to arithmetic, mensuration, book-keeping, &c., I would propose that a certificated examiner of known ability be engaged for that purpose by the Society, and a fee paid by the candidate for each examination.

The object of having a neutral party for

mination of what may be termed the onal part, would be to put the candi- ı a more impartial examination, and :herefore shew that the efforts of the · were conducted on sound educational ıles, each part of the requirements :xamined and attested by those practi- cquainted with the respective branches. needless to say that a Register conduc- sound educational and practical princi- is bound to further the interest of :al foresters, and give landed proprie- ı opportunity of having the right man right place, which is hardly possible private register; for very often an ap- t may be furnished with a host of certifi- a number of which may be from parties :e not capable of judging, or who know ır nothing about the person, and, from motives to advance each other's ıts, may make such certificates a great etter than they ought to be, thereby ing the parties that may employ them. ther, I would deprecate the very idea ring qualifications bought or obtained ribery in any way whatever. Such ɔts should be made publicly known at st general meeting, and the person or ıs struck off the list of members.

an illustration of this species of decep- hough not in regard to forestry, I hope) llowing extract will shew how our ıental brethren award their certifi- —"We are glad to see the public alive deceptive nature of German degrees. any sensible man,' says a writer in the *n Herald*, 'can even for a moment allow lf to be tempted into the folly of dubbing lf Ph.D., or LL.D., or anything else, by neans as we have related, passes our ·ehension. The holders of these pur- l humbugs, have not, of course, heard sop. Twenty-five or fifteen pounds quired, not a knowledge of the classical s. But Æsop tells a story of an ass dressed itself in a lion's skin, and eded admirably in inspiring fear and :t amongst the beasts of the forest. So good. But the ass, in an evil moment, nined to roar, but only brayed. It was a very natural thing; it was his own voice, and we are not much grieved that the vanity of the ass was punished by the beasts falling upon him and tearing him to pieces. The moral of the story, as we apply it, can easily be drawn by our readers. To conclude with a suggestion. We would advise all holders of degrees, when they are announced officially, to place the name of their university within brackets, after the degree itself. We should then be able to honour an M.A. (Oxford, or Cantab.), or B.A. (Lond., Dur., or Dub.), and LL.D. (bought). The public could then discriminate between real degrees and shams, and a few years would soon suffice to rid us of one of the most contemptible and absurd practices that we have ever investigated. To clear literature of this taint is the duty of scholars. If they allow it to go on unchecked, they must not be surprised to find the lawful degrees suspected equally with the unlawful ones. They must not be grieved when they find that that which should be an honour, and inspire confidence and respect, is treated only with a cynical sneer."

In regard to the mode of conducting examinations, the Board of Examiners should meet once a-year for the purpose of examining candidates and granting of certificates. The time of meeting might be—say in the month of September, so that the progress of the Register may be brought before the Society at the Annual General Meetings.

The examination to be both written and oral, and the value of the answers should be determined by marks. The Examiners should decide on the number of marks to be awarded by the position of the candidate, the value of his employer's certificate, the rate of wages (as vouched for by his employer), and degree of merit of examination.

The certificates should be arranged under three distinct classes :—First, A first-class certificate for those that have passed a successful examination and are deemed "excellent." Second, a second-class certifi- for those that are deemed "good." Third, a third-class certificate for those that are only capable for an "assistant forester."

The Register Roll to be classed under

three distinct heads according to the value of the certificates. Head-foresters with a first-class certificate and a salary from £80 to £100 per annum. Second, those with a second-class certificate and a salary of £60 per annum. Third, under or assistant-foresters.

A candidate wishing to be put on the Register Roll as head-forester must be a member of the Society for twelve months previous to being enrolled, and be provided with proper certificates as to character and ability, and of his having been employed for at least five years in working in woods and plantations, and give satisfactory reference in connexion with the various requirements, and pass an examination on the following subjects:—

1. A candidate for a head-forester's situation must have had five years' experience in woods and plantations; and in case of being in various places during that period, not less than twelve months to be counted, and each separate engagement to be certified by a certificate from the respective employers.

2. The candidate must pass an examination in the ordinary rules of arithmetic, book-keeping, timber measuring, and land measuring, such as may be deemed necessary in computing the area of a field or plantation.

3. He must be able to dictate and write a letter, such as may be necessary in transacting business in connexion with woods and plantations.

4. He must also be able to answer any questions that may be deemed requisite, as to qualifications and ability, as a practical forester.

In the event of a candidate not passing a successful examination for a head-forester's situation, if deemed capable, he may be eligible as an assistant-forester.

Assistant or under-foresters will only require to be possessed of a certificate as to character and ability from his employers, also attesting that he has been employed at least two years on woods and plantations, must write a fair hand, and be acquainted with the common rules of arithmetic.

A candidate must specify what salary he wishes to be put on the Register for, and sl that he has passed an examination in above subjects, all of which must be certi by the respective Examiners appointed that purpose.

A forester who has been dismissed fi his situation through bad behaviour or int perance, not to be allowed to be put on list of candidates as a head-forester, but i be eligible as a foreman; and if he sh prove himself unworthy of that situation, t no more eligible as a candidate. But i should prove himself worthy, and of ste habits for eighteen months after his being missed from his former situation, he may come eligible as a candidate for a head-fo ter's place; but should he prove himself worthy to his second employer, to be str out of the list of members and no more elig

Further, if a head-forester should p himself dishonest, to be no more eligible candidate, and his name to be removed f the list of members.

In conclusion, I would propose tha order to have questions definitely put answered, an examination or text-book taining the full requirements, and also most approved views on forestry, be com by a committee appointed by the Soci and in order that the work be accompli with the least possible labour, I would fu suggest that a selection and revision o most practical papers already publishe the Society be made for that purpose.

Such a book is absolutely necessary t move any vague or uncertain views on f try, which must necessarily be the ca every one is left to his own or the wa opinions of promiscuous writers. Bes such a book would not only be of advar to the Society in connexion with the Reg but would also be a public benefit; would be a book of standard reference f connected with or interested in forestry. these days of enterprise, such an underta is sure to be successful, and would be more step towards raising the Scottish Ar cultural Society in the confidence of p estimation.

TREES AND UNDERWOOD BEST SUITED FOR PLANTING ON SEA-COASTS.

BY C. Y. MICHIE, FORESTER, CULLEN HOUSE, CULLEN.

TO plant with a view of growing trees successfully and profitably within the influence of the sea, where the wind passes unbroken over a large surface of water, such as the coast of Aberdeenshire and Banffshire, is an undertaking which few would risk. But as comparative rather than absolute success is what, under such circumstances, is looked for, the observation and experience of one who has both failed and succeeded in such works may be of some interest.

We have been induced to visit almost every important part of our Scottish and English coasts, and see "that we might believe" regarding the success or failure of all plantations, shrubberies, bushes, or hedges, so situated as to be under the free and full influence of the sea-breeze. We were assured by one party that the Pinus Pinaster was to be found growing luxuriantly in the open mouth of the German Ocean, along the coasts of Aberdeenshire and Banffshire; but on examining all parts exposed we found no such trees growing even moderately; and all that remained was a few of the lower branches, supported by a weather-beaten stem without a top, only a few inches high; and neither tree nor shrub made any pretensions to growth beyond a bare existence.

Not long ago, a writer to our local papers, in a lengthened article upon plants which luxuriate in maritime situations, described the sea buckthorn (Hippophæa rhamnoides) as growing at Dunrobin Castle, in Sutherlandshire, close upon the margin of the sea, even laved by its surging waves. Not having seen it grow as there described, we made a tour so as to include this interesting sight, and try to ascertain why the sea buckthorn should grow there almost bathed in briny water, while under our own care a full hundred yards from the sea, it scarcely grows at all. The secret we found to be, that while the situation of the sea buckthorn under our own charge is fully and keenly exposed to a great breadth of the German Ocean, the beautiful and luxuriant groups at Dunrobin are completely sheltered from the destructive prevailing winds of the oce

Some years ago, we were told of the successful growth of sycamore, ash, and Wych elm, upon the sea-coast, down to the water's edge at high tide, between Inverness and Beauly. Not having seen trees grow as thus described, we anxiously looked forward to the time when we could witness for ourselves. The time did arrive, and we examined with no small interest and delight a beautiful belt of hardwoods, extending, as we described, close along upon the shore, in excellent condition and vigour of growth. It, however, required only a glance of the eye to see the producing cause of this, viz., the shelter afforded by the Black Isle on the other side of the Firth. In proceeding farther north, the fine growth of the woods and plantations surprise those who have not hitherto seen them, and all along the coast side where trees or shrubs have been planted, down even to the edge of the water, they are growing vigorously, owing no doubt to the modifying and ameliorating effects of the surrounding islands and promontories.

When Nature has withheld her favours for the growth of trees upon the sea-coast, Art may be called upon to aid the deficiency. Take the following by way of example:—There is a farm-steading within three-fourths of a mile of the Moray Firth, in Banffshire where the tenant, disliking the exposure, and anxious to rear a plantation to shelter it, planted a group of trees around his premises

comprising the common sorts of forest trees, both deciduous and evergreen. Year after year he continued to plant, in consequence of the deaths that annually occurred, but without success, till some person suggested to him to trench the ground. The proprietor was applied to and consented to do this part of the work, which was soon executed, and the ground once more planted with the same description of trees; and the results have been, that the trees, from the time of trenching the ground, grew well, and so continued growing; and many of them are at the present time equal in size to those farther inland of the same age. The writer thinned the plantation in 1867, and found the trees both in a healthy and prosperous condition, the only defect being want of lateral branches, from the trees being in many cases too much drawn up, the result of want of early thinning. The outside row of trees exposed to the north (or sea-side) were considerably affected by the sea winds, being bent towards the land-side, assuming a cowering attitude, stooping as if to allow the blast to pass over them. The list of trees of this plantation comprised Wych elm, lime, ash, oak, sycamore, birch, and white poplar, together with Norway spruce, larch, and Scots pine. The sycamore is decidedly the most prosperous of any, and next to it, in succession, the ash, elm, oak, poplar, birch, lime, Scots pine, larch, and spruce. There is also a hedge of elder surrounding the plantation inside of a post and rail paling. The hedge has uniformly continued healthy and growing, and requires constant trimming to keep it within due limits; and to it, there is no doubt, the trees were indebted for the shelter afforded them when young.

It cannot be said that this plantation is so close to the sea as fairly to indicate the sorts of trees best adapted for maritime planting; but it shews at least that while no plantation could be reared before the ground was trenched, it succeeded well afterwards. Thus manifesting, that while the influence of the sea-breeze is such as to prevent the trees from making headway on unfavourable soil, it fails to check their growth when the soil is rendered loose and suitable.

Another example of a different kind may be cited to shew the effects of the sea-breeze, after passing over a large expanse of ocean, and beating without interruption or impediment upon a bleak exposure, entirely void of shelter. A fine grassy bank skirts the sea-shore at Port-Cullen, in Banffshire, which the proprietor was desirous of planting, to form a protection to his magnificent policy grounds lying behind. A forester of considerable note was consulted upon the subject, who recommended planting it with Pinasters, which was done, and several times repeated, but without avail. Other descriptions of Coniferæ were also tried, including Pinus Austriaca, Pinus Laricio, larch, and native Scots pine, but they all shared the same fate; and now (12 years subsequently) the larch is the only plant visible upon the ground, and only that part of it is vital which is partially covered with the rank herbage; but the top and leading shoots, as they begin to advance, are met with a gust of sea-air, which renders them as brown and dead as if burnt by fire. This bank, be it observed, is very abrupt, and about 150 feet in height, with the ground sloping to the sea, so that no shelter could be afforded by one tree to another till they had at least risen a few feet high. The base of the bank is only about 100 yards inland from the sea at high water; so that during a storm the spray is seen and felt upon the face and hands.

The project of planting having completely failed, after a fair trial with Coniferæ, and as winter shelter was only what was required, deciduous trees were not tried, which, although unlikely ever to become more than bushes, would undoubtedly have succeeded better than the evergreens. In the meantime, however, the scheme is abandoned, and the ground laid out for sheep pasture.

At a short distance from the bank above referred to, an ornamental cottage was built, which it was thought desirable to beautify, if possible, with some sort of trees or shrubs. Observing the failure of those upon the bank near by, it was thought advisable to try some other description of plants. A considerable variety of shrubs were planted, including

ahonia aquifolium, Spiræa adiantifolia, owberry (Symphoricarpus racemosus), sea uckthorn, (Hippophæa rhamnoides), elder ambucus nigra). On examining the shrubery at the present time, I find the sea buckthorn doing better than all the others; it has wer dead branches upon it, and its foliage more perfect and healthy. The elder, which as planted to form a screen to the other lants, has accomplished all that was anticiated of it; and although there are some ead branches upon it, yet the profusion of rong and vigorous shoots are such as to tone for all minor defects. The Spiræa and owberry are of about equal growth, and ew great hardiness and adaptation for such xposures; but when choice can be made, it s better to select the more robust sorts for he most prominent and exposed parts, and hose less vigorous for subordinate and more heltered places. Whether from soil or severe xposure, the others did not succeed so well, robably owing to the tenacity and clayey ature of the soil. It was not adapted to the ahonia, and some other plants known to prefer a dry light soil.

In the same locality as the cottage and bank referred to, and distant from the sea about 150 yards, is a plantation of large extent, and about forty years of age. Along the north side of this plantation, and between it and the sea, extends a stone-and-lime wall, about 9 feet high. The trees inside the wall grow well till they reach the top of it, when, straight and level, as if cut with a pruning-knife, the whole tops are indiscriminately shorn off. Those trees next the wall are shorn level with the cope, and gradually as they recede from it they become taller. The incline of the surface so produced is about 1 to 10, appearing somewhat at a distance like a large flat thatched roof. It is worthy of notice, that no visible difference as to hardiness, or power to withstand the influence of the sea-breeze, is here manifested, every species and variety share the same fate. Hard-woods of every sort, and pines also, equally suffer.

The exposure is so great, and force of wind so strong, combined with the salt spray, that not only is vegetation destroyed, but nails in fences, bands and fastenings of gates and iron railing are destroyed within a few years. A stone-wall as a protection to trees, where it is intended they should rise above it, is the worst description of fence possible, as the wind is nowhere so powerful and hurtful as just at the top of the wall. In all such cases, when a stone-wall is necessary, and it is desirable to grow trees higher than the wall, it is advisable to erect a light palisade paling on the top, which modifies and subdues the influence of the wind. Trees grown behind a wall suffer on two accounts—first, from the concentrated force of the wind; and, secondly, from the shoots and foliage being (from shelter and confinement) more delicate and tender than in any other situation.

Another example may be cited of a still older plantation than any given (seventy to eighty years old), situated within one mile of the Moray Firth, on the coast of Banffshire. We have several times carefully examined the margin of this plantation exposed to the north or seaward side, with the view of ascertaining which of all the species of trees had best succeeded. The following is the order of health and perfection in which they are found at the present time:—1st, the aspen, or wild poplar (Populus tremula); 2d, the sycamore; 3d, the ash; 4th, the elm; 5th, the oak; 6th, the birch; and last, of deciduous trees, the beech, which unfortunately suffers very severely when a sea-storm occurs at any time during the early part of summer. Amongst evergreens, I find the silver fir by far the most prosperous; in many cases it is twenty feet above all the surrounding trees, and thick in proportion; 2d, the Scots pine; 3d, the Norway spruce. It is here worthy of notice how much superior the silver fir is to the spruce; and, contrary to the opinion of many foresters and planters, instead of being delicate and tender, it is by far the most robust of any tree in the whole plantation, being fully 15 feet above all others.

The reader will probably feel surprised at no mention being made of Coniferæ, and no place being assigned to any of them. The reason of this is, that the foliage of evergreens suffer so greatly in winter as to cause them invariably to become bare and unsightly,

besides presenting at all times a withered and burnt appearance, which is not experienced by hard-woods to any serious extent; and besides, when hard-woods do sustain a blight, which generally happens about or before mid-summer, a little judicious pruning soon corrects all that is amiss. If, however, it is found desirable to plant for sake of winter-shelter we would recommend as the best which we have tried or seen, the following, in order:—1st, The best for sake of shelter is the Pinus Austriaca; 2d, Pinus Pinaster maritima; and the 3d, the common silver fir.

Recapitulation of trees and shrubs best adapted for planting within severe influence of the sea-breeze, beginning with deciduous trees, and taking them in their preferential order, and considering them in their adaptation to maritime situations rather than their usefulness as timber or mercantile value:—

Trees.—1. The Trembling Poplar, Populus tremula; 2. The Goat Willow, Salix caprea; 3. The Sycamore, Acer Pseudo-Platanus; 4. Rowan Tree, Pyrus aucuparia; 5. Wild Cherry Tree, Cerasus sylvestris; 6. Common Ash, Fraxinus excelsior; 7. The Wych Elm, Ulmus montana; 8. The Oak, Quercus rubra.

Amongst Coniferæ, the following are considered the best to withstand exposure to the sea:—

Trees.—1. Pinus Austriaca, Austrian Pine 2. Pinus Pinaster maritima, Maritime Pine 3. Picea pectinata, Silver Fir; 4. Pinus sylvestris, Scots Pine; 5. Pinus Laricio, Corsican Pine; 6. Pinus Douglasii, Douglas Spruce.

Shrubs, in their order of hardiness against the sea-breeze:—

1. The Elder, Sambucus nigra; 2. Sea Buckthorn, Hippophæa rhamnoides; 3. Snowberry, Symphoricarpus racemosus; 4. Spiræa adiantifolia; 5. Mahonia aquifolium, Evergreen Barberry; 6. The Tamarisk, Tamarix gallica.*

In connexion with planting any of the preceding list of trees or shrubs, special attention is called to the state of the ground, which, if unsuitable, must either be improved or failure will be the inevitable result.

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* Why are the following omitted?—Scotch Rose, Sweet Birch, and Hawthorn, are native shrubs which grow on the sea-coast; also Pinus pumila, the Huntingdon Willow, &c.—Ed.

The Stable.

HORSE-SHOEING IN THE METROPOLIS.

NE of the facts which the London horse owner advances as an exemplifica- of the extent to which animal power is and, we may add, also abused, in the opolis, is the number of *lame* horses, ı far exceeds that of even several large ncial towns united, relatively as well as aratively. A proprietor of some stand- and experience remarked in our pre- some time ago, "If you want experi- in foot-lameness among horses, come to lon;" and to the invitation we rejoined, u must have a very defective system of agement of horses' feet to enable you to e such an offer;" and still pursuing the ct, we inquired, "Do you estimate the as being creditable to Metropolitan sys- of farriery?" "How can you help it? can horses travel on the hard roads out battering their feet, and ultimately g lame? Such is the extent of informa- on the point at issue, that, in few in- es, has the inquirer cared to go further, hence we find that lameness and illness ng animals are deemed inevitable, where- they are kept. In London we not only nany lame horses, but find frequently the whole traffic of a long and busy t is completely interrupted by a horse ıg fallen down, and crowds of busy- es look on, cry, condemn, and offer ss advice, while—none we were about y—at least few render their help in the gency. Some time ago, we saw a crowd ing upon the pavement of both sides of row street leading from the river to the d, while a beautiful creature struggled ove a van-load of wine, with which he been brought to a dead stand. The r sat in the front of the carriage, and by and rein endeavoured to urge the ani- mal on. The by-standers, profuse in advice, jeers, and grins, raised the ire of the driver, who dismounted, and first by coaxing, next by tugging at the bit, and subsequent thrash- ing and kicking, endeavoured, but failed, to get the willing animal to move the load be- yond a few inches, and even then only by great danger of damage to the knees and legs from slipping. The horse tore and fought the ground, he perspired, and breathed short and with difficulty, the sparks flew, and at length the poor thing screamed in his disappointment, while in every effort the load dragged him as far backward. By a few words, the by- standers were drawn in to help—they seized the wheels, and used the spokes as levers; others pushed behind, and the creature plunged into the collar, and proudly took the load into the busy thoroughfare, and disappeared in the throng, doubtless soon to encounter a similar difficulty at the least rising ground, with the greasy state of the streets.

It is the *questio vexata* among Metropolitan horse-owners and farriers generally, and yet all agree that the flat shoe must not be dis- continued among animals used in draught. "Heels and toes," say they, "will not do on the stones. It's all very well on ma- cadamised roads; there they have some- thing to grip, but on the stones there is no- thing." The result is, heels and toes are not used, and merely because such an opinion is held, not from experience gained by trial. How is it, we may ask, that horses employed in the streets of Sheffield, Leeds, Hull, Brad- ford, Halifax, Edinburgh, Glasgow, &c., travel so well? The roads are paved with stones as slippery and as hard as any we have seen in London or the suburbs. Rain, sleet, and dirt combined, are as plentiful in those

towns, and conspire to add intensity to the evils of steep ascents, which the stay-at-home Cockney horseman knows nothing of. Lameness is not so common in the feet; broken knees and lacerated fetlocks very rare, and this is the pride of the farriers; while in the Metropolis there is the experience that usually makes fools wise, but at the sacrifice of much suffering as well as muscular power.

The condemnation so plentifully heaped on the provincial system of shoeing horses, we are pleased to find, is about to suffer considerable check. It has already been attempted years ago by private individuals, who, however, have been swamped by the tide of vulgar prejudice; but *a Society* can move with power where persons are trodden down. Passing down Charing Cross, a few days ago, we observed a draught-horse, fully equipped for work, standing near the Refuge, protected by a blanket, and attended by a man. Attached to the harness was the announcement, plainly printed on a large card, "A Free Trace Horse. This horse is shod with heels and claws, a system which answers so well in the north and west of England, and Scotland." The animal, we found on examination, is shod with an armament provided with the usual toe-piece and heels with which the horses of the north mount the inclines so easily, and he is placed there by the Royal Society for the Prevention of Cruelty to Animals, in order to assist the horses with heavy loads to ascend the incline, and thus test the superiority of the system over the absurd flat shoe now in too common use. Further inquiries assured us, the animal's services, up to the present, have not been called into frequent requisition, but the broad statement on the card, offering to "Give a Pull-up," is too tempting even for a Cockney to resist, and we hope to see ere long that conviction will ensue, and sensible rules be accepted, to the exclusion of absurd theories and traditional acts, from the place which should be the last, in a progressive age, to exhibit them. We reiterate, that the system found to answer in securing a good foothold for our horses in towns having gradients of the steepest character, when drawing the heaviest loads, must answer in London, where not one-twentieth part of the difficulties are presented. The only obstacle, however, is stupendous—prejudice, combined with ignorance on the subject—and if the Royal Society for the Prevention of Cruelty to Animals can succeed in uprooting it, a noble work in humanity will be accomplished, and one of the chief causes of the excessive number of cases of foot lameness, about which absurd boasting is made, thoroughly and efficiently banished.

A CURE FOR PLEURO-PNEUMONIA.

MR JOHN BEASLEY, of Chapel Brampton, Northampton, writes to the *Times*, as received from Mr Baldwin, the Principal Inspector of Agricultural Schools in Ireland:—Contagious Pleuro-pneumonia is propagated by a specific poison or *contagium*, which is generated in the lungs and expired in the process of respiration. It has hitherto baffled all treatment. I have devised a mode of dealing with it which so far has been eminently successful; and as to principles on which it is based, is simple and sound, and has met the approval of the eminent men to whom I have communicated it I give you a concise account of the *modus operandi*. I may premise that my great aim is to check the spread of the infection, but the means I take to carry out this object has a curative effect. The following is the course to be pursued when the disease appears in the herd:—First of all you isolate or remove the animal affected.

, should the poison have been im-
one or more from the animal in
ıe disease has first appeared, the
ıg is to confine it to them, and this
ding idea of the scheme, and it is
shed by, thirdly, tying up the ani-
ı house. In my case, the feeding
re placed round the cow-house, and
ıls face the wall; on this wall is fixed
of each beast a square piece of
cking; the cloth is saturated three
ay with a solution of carbolic acid
as noted below. As the poison is
d from the system it is destroyed by
ollc acid, which experience has
› be the best disinfectant. Fourthly,
ray the infection cannot reach an
ee from it when the herd is tied up.
l on which I first operated was
melting away before I commenced
riment; only one fresh case has
d itself, and that animal has re-
As to the curative action of carbolic
ıll not say much, having no desire
: into the region of medical science.
ugh for me to say that the most
medical men now cause human
uffering from certain forms of lung
› imbibe carbolic acid; this mode
of treatment has been most successful, and from the *post mortem* appearances of the lungs in pleuro-pneumonia we should expect the imbibation of this acid would be equally efficacious in arresting the progress of the disease. To dissolve the carbolic acid of commerce, it must be mixed with an alkaline substance. I use for the purpose lime; it is the cheapest and most easily obtained, but potash or soda would be better. The strength of the solution I employ is one part of carbolic acid to fifty of water.

Mr Dobson, a veterinary surgeon, writing from Kettering, Northampton, confirms the opinion of Mr Beasley about the effectiveness of carbolic acid as a curative agent in cases of pleuro-pneumonia. He says:—

> I have a large district under my superintendence as inspector under the Cattle Diseases Contagion Act, and whenever I could, I have induced stockowners to give it a trial. I do not, of course, put this specific medicine forth as a "cure all," but I am quite sure that, if used in the early stages—and in these only is this or any treatment available—it will save a considerable per centage of animals attacked. The dose I have been in the habit of prescribing is one dram of glacial carbolic acid to a pint of water, given to the animal three times a-day; but I may say that in all cases it should be given under the superintendence of a professional man, as complications may arise which he only is capable of dealing with.

ARE ACORNS POISONOUS.

have given prominence to the dis-
:ussion about acorns in our pages
e consider the subject a most import-

For this reason: that there is pro-
lepartment of veterinary medicine in
ater misconception occurs, or where
ct estimates are made by non-pro-
›ersons who presume to pronounce
s in that which takes cognizance of
tritious and things absolutely hurt-
ven poisonous. Judgment is given
ry variable and even apocryphal
and, in the end, we have authori-
ties starting up here and there with results diametrically opposed to each other, and sometimes to common sense itself. Sir George Jenkinson asserts acorns *are* poisonous, as we have before noticed, and he bases his assertion upon an uncertain number of deaths taking place among cattle that have consumed them. Correspondents, on the other side, give as positive facts, that sheep, calves, and especially pigs, feed largely upon them with enjoyment and great benefit—fatal effects being unknown.

What does Sir George say to the fact that

great numbers of animals—horses and cattle —die after only a few hours' illness when the common articles of food only have been taken by them? In Edinburgh, Glasgow, London, and many large towns of Britain, it is no uncommon occurrence in some large establishments to lose one horse per week from indigestion alone. The London General Omnibus Company, who have boasted so much of the saving effected by the use of that most innutritious article of diet—maize or Indian corn, for obvious reasons keep back the amount of their mortality. The length of their sick list might furnish important information on the question of aliment *v.* poison, which would instruct the curious in nice calculations, and tend to throw some light on the acorn question.

Nearly every one connected with agriculture is acquainted with the fact, that tobacco infusion is positively dangerous to sheep when used as a wash or bath for the cure of scab and extirpation of parasites from the fleece; yet the goat will consume larger quantities with perfect relish and freedom from harm. Before proper conclusions can be arrived at on these questions by outsiders, a little more abstract knowledge must be obtained. The sciences of botany, chemistry, comparative anatomy, and physiology, must be brought to bear, and much of the doubt and mystification that now shrouds the matter will be cleared up, and future errors, as well as losses, avoided.

The oak, in all its parts, even to parasitic or fungous growths which are found upon it, yields large quantities of tannin — tannic acid—and on that account the bark, as is well known, is employed in tanning skins. The conversion of animal matter into leather is a fact which Sir George Jenkinson, Bart., should have remembered when writing about the deaths among his stock. What, therefore, takes place when *dead* animal matter is steeped in a strong solution of tannic acid, is similar to the state produced upon the albuminous parts of the blood when that substance is largely taken up into it—coagulation—a fact which the chemist embraces as a test for the presence of albumen in solution. We must, however, go a little further, and we shall discover why pigs may eat with impunity from the pot whence death comes to cattle.

The pig is known as a monogastric animal, *i.e.*, having one stomach. The intestines also are very mobile and active, digestion being rapid, while the stomach is small; a small quantity only of food, therefore, can be accommodated, which quickly passes onwards throughout the alimentary track. Another feature is significant: the pig is omnivorous, and his meals of acorns are always garnished with other articles of food, as well as rubbish. His predatory habits wonderfully facilitate the action of the bowels, and thus food is not retained too long, and constipation greatly avoided. Bovine animals, cattle and sheep, on the other hand, are differently constructed. The stomach is quadrisect, or, in other words, is divided into four compartments, each having a separate formation as well as endowed with special functions. This organ is designed to saturate, dissolve, grind, press, and retain the food, until every particle of nutritious aliment is abstracted; and when close investigations have been instituted, we have proved beyond all doubt that portions of food have been retained in the third compartment for upwards of six weeks. The arrangement of the manifolds (omasum, or third stomach, so called) eminently secures this occurrence, and in nearly all states of derangement of the animal the organ suffers intensely. Constipation is obstinate, purgation almost impossible, and death rarely averted, even in derangement after excessive indulgence in good and natural food. How much more certain death, then, after the powerful astringent effect of tannic acid pervading the circulation from end to end, destroying its fluidity and flow, arresting secretions and the functions of organs generally, in which the great centre of nervous force suffers, perhaps most of all, we leave to abler minds to solve.

Tannic acid need not be included in the category of poisons to produce these effects. It does not destroy life by mere presence, disorganization or destruction of tissue, but

· arresting function. *Post mortem* exami-
ıtions reveal symptoms akin to those
· rinderpest itself. The blood-vessels are
›rged until their walls are weakened
ıd distended sufficiently to allow of blood
self to exude and form large patches,
ılled, by those who know no better, inflam-
ıation. The rugouse parts of the small
ıtestines internally exhibit these states most
equently, while the surface externally, as
ell as that of all organs invested by a
ansparent membrane, are also plentifully
rovided with them. The leaves of the third
tomach, and sometimes the intestines also,
re perforated — large holes being found
hrough which a quill or finger may be passed
asily, the edges exhibiting the usual signs of
ascular engorgement and arrest of circula-
ion, from which the part, centrally, has lite-
ally died, and subsequently removed—a
rocess known as mortification and sloughing.
hat there are important differences between
hese *post mortem* appearances and those of
inderpest, we admit, but do not feel it
ecessary here to go into a detail of them;
et, we must remind our readers, the results
f cattle eating acorns and young shoots of
ak trees have ere now been confounded with
attle plague. That deaths occurring from
n excess of food of this character is no
roof of poisonous action, is borne out by
he fact that the same revelations are some-
imes found after an excess of other vegeta-
ion. The period of the year, scarcity of ordi-
ary food, &c., determines much of the fatality
mong animals which we have to deplore.
When one kind of food fails, hunger drives them to eat another which they would not notice in times of plenty. And if the curious inquire why these disastrous effects did not occur ages ago, we may safely state they *have* done so, undoubtedly, but faulty observation, and still more faulty methods of recording events, have failed to shew that equinoxial gales, dry summers, and scanty herbage, excited the influences we now discover. That our predecessors failed to understand and record ordinary occurrences, is patent in numberless instances; but their omissions form no reason why we should accept probabilities where certainties may be realized by the expenditure of a small portion of time and the exercise of common sense.

We do not wish our readers to infer that pigs do not suffer from the effects of acorns. Every one who has tasted the flesh of animals fed upon them is aware that a degree of toughness is always present, and in some instances to an unpleasant extent; and if acorns became the exclusive food, the same results would follow as in the case of bovine animals; but, from the anatomical and other differences already referred to, at a somewhat later period. The presence of tannic acid renders the acorn highly indigestible, and, in excess, interferes with circulation and secretion; but death frequently occurs long before the more elaborate functions are arrested from acute indigestion. This subject has met with useful notice in "The Veterinarian's Pocket Remembrancer," to which we refer our readers for authentic information upon it, as well as upon a multitude of other ailments to which animal flesh is heir to.

CHRONIC NEPHRITIS.

INFLAMMATION of the kidneys in the chronic form is more frequently met with than the acute disorder in the lower animals, and aged horses are frequently found affected with this disease, especially such as are exposed to sudden changes of temperature and other debilitating influences, and that have been often dosed with large quantities of medicines possessing diuretic properties. The symptoms resulting from chronic nephritis are a gradual loss of flesh, pain in the region of the loins, and impaired action of the hind extremities. The urine is also occasionally very highly coloured.

In treating this affection, the horse should be allowed perfect rest, and have a generous diet of easily digested food: also plenty of mucilaginous drinks. The loins may be rubbed every third or fourth day with mustard; and 1 drachm of tartar emetic given every night. This medicine can be conveniently administered mixed with the food.

Enlargement or hypertrophy of the kidney also occurs, and cases have been met with where the kidney was enormously enlarged, and found to weigh upwards of 50 lb. In cases of hypertrophy of the kidney, very little can be done to afford relief.

URINARY CALCULI.

A frequent cause of irritation in the urinary organs, either of the horse or ox, is calculi, which are found throughout the whole of the organs, and are classified according to their situation. When found in the kidneys, they are known as renal calculi; in the ureters, as ureteral; whilst in the bladder, they are designated cystic or vesical.

In certain diseased conditions of the kidneys, they are frequently found in great numbers. The general symptoms of urinary calculi, are a difficulty in urinating, and the urine presents a difference in its colour, sometimes being very light, in other cases very dark, and apparently mixed with blood. The patient occasionally shews colicky pains by lying down and rolling, and gradually falls off in condition. When the calcareous deposits are situated within the bladder, they frequently attain considerable size, and cases are noticed when the calculus has weighed several ounces. Vesical calculi are also found to differ in their character; some specimens are very hard, whilst others are of a soft pasty nature. In all cases they are found to be composed largely of some of the combinations of lime, and particularly the carbonate. It has also been noticed that these concretions are oftenest met with in horses pasturing on limestone districts, or when the drinking water contains lime in large quantities. Cystic calculi can generally be readily detected. The urine is very highly coloured, and tinged with blood, and passed often. When the stone passes towards the neck of the bladder, it produces retention of urine, which is speedily followed by acute pain, and the horse throws himself about, straining violently and looking towards his flanks. In other cases he walks with a stiff straddling action. When the above symptons are presented, an examination should be made *per rectum*, which will tend to reveal the nature of the disease.

In the treatment of urinal calculi, the mineral acids have been found beneficial, as 1 drachm of hydrochloric acid daily, which must be largely diluted with water, and its use continued for some time.

The Dairy and Poultry-Yard.

FATTENING POULTRY FOR THE MARKET.

ANY breeders who rear fowls for the market believe in letting poultry or themselves; others believe the best is in keeping them constantly in high This is just our idea: for where a and regular profit is required from poultry, or a business is made thereof, best method, whether for domestic or the market, is constant high keep e beginning. Thus they will always saleable condition and ready for the Their flesh will be superior in juiciness her in flavour than those which are from a low and emaciated state. the manner above indicated, spring ure particularly fine, commanding the price on the market, and proving a ealthful, nourishing, and restorative

ttening fowls confined in coops, old ecommend feeding them with bread in ale, wine, or milk; barley mixed ilk, and seasoned with mustard or ed; while others recommend cram- iem three or four times a-day; also them in a dark place, and not allow- n any exercise. Bradley says, "The y, and the quickest, to fatten them, it them into coops as usual, and feed ith barley meal, being particular to mall quantity of brick dust in their vhich they should never be without. it will give them an appetite for their nd fatten them very soon." Yet writer says they should be shut up ney can get no gravel; keep corn by l the time, and also give them dough for one feed a-day. For drink, give immed milk; with this feed they will n ten days; if they are kept over ten days, they should have some gravel, or they will fall away.

One mode of fattening poultry extensively, is to feed them with steamed or baked potatoes, warm, three or four times a-day; the fowls are taken in good condition from the yard, confined in dry, well-ventilated coops, and covered in, so as to prevent the entrance of too much light. It is said this method is attended with the greatest success.

In all cases in fattening fowls, whether old or young, we should remember that the food be cooked and fed warm. Barley meal, or mixed with equal quantities of Indian meal made into a thick paste or porridge, and fed warm, is about as good a feed as we know of, and seems to make flesh faster and more solid, and gives it a golden colour and plump appearance after being dressed.

KILLING AND DRESSING POULTRY.

As much, if not more, depends on the manner of killing poultry as in the dressing to have it look fit for market. Too much caution cannot be used in this branch of the business. One mode of killing fowls (instead of wringing the necks, which we deprecate), is to cut their heads off with a single blow of a sharp axe, hang them up by the legs and allow them to bleed freely, and pluck their feathers immediately—while warm. The French mode, which is highly commended, we think far the best, as it causes instant death without pain or disfigurement, and is simply done by opening the beak of the fowl, and with a sharp-pointed and narrow-bladed knife, make an incision at the back of the roof, which will divide the vertebræ, and cause immediate death, after

which hang the fowl up by the legs till the bleeding ceases, and pick it while warm if you desire the feathers to be removed. With a little care the skin of the fowl does not become so torn and ragged as it does in the old-fashioned way of scalding. Another thing, the flesh presents a better and more natural appearance when not scalded.

Geyelin says "Some breeders cram their poultry before killing, to make them appear heavy; this is most injudicious, as the undigested food soon enters into fermentation and putrefaction takes place, as is evidenced by the quantity of greenish, putrid-looking fowls that are seen in the markets." Fowls should always be allowed to remain in their coops at least twenty-four hours previous to being killed, without food by so doing, the poultry will keep longer and present a better appearance in the market and, above all, he will shew the purchaser that he is honest, and has not crammed his poultry for the purpose of benefiting himself and swindling others.

BOXING POULTRY FOR MARKET.

On the subject of boxing poultry for market Dr Bennet says:—"It should be carefully packed in baskets or boxes, and, above all, it should be kept from the frost. A friend of mine, who was very nice in these matters, used to bring his turkeys to market in the finest order possible, and always obtained a ready sale and the highest market price. His method was to pick them dry, while warm, and dress them in the neatest manner; then take a long, deep, narrow, tight box, with a stick running from end to end of the box, and hang the turkeys by the legs over the stick, which prevents bruising or disfiguring them in the least." The way poultry is frequently forwarded to city markets is enough to disgust almost any one, and throws odium on breeders as a class.

POULTRY AND POULTRY SHOWS.

THE several energetic Poultry Societies which have come into existence within a few years are making themselves felt all over the country, in exciting interest in all kinds of poultry, and causing ambitious amateurs, with little experience, but having choice stock, to wish to exhibit their pets. It is painful to see how many fail of obtaining consideration on account of the birds not matching in the coop, or possessing some other disqualification.

In selecting a trio of fowls for exhibition, pick them out a month beforehand, and look them over carefully for false feathers or other points. They must be healthy of good size, and possessing all the characteristic marks of the breed. Almost all of the modern poultry-books indicate, with sufficient clearness, what points are inadmissible. For instance, a wry, lopping comb on a Black Spanish cock would throw out the whole trio if properly judged. So would a red feather in his hackle; so also an erect, straight comb upon a hen of that breed hence it is very important to select the fowls with a knowledge of these points. One often sees coops containing one single-combed and one double or rose-combed hen one white or pink-legged and one yellow-legged hen, or the hens and cock not agreeing in these points. Slate-coloured legs are characteristic of Hamburgs and Polands. Do not shew pale or whitish ones. Hamburgs must have white ear-lobes (deaf ears); if the judges are strict, red-eared ones would be thrown out. In size, points of plumage, legs, beaks, eyes, and colour, the hens should match as perfectly as possible, and they should also match the cock in style of comb, colour

of legs, bills, and eyes, and in having that plumage which is recognized as appropriate to go with his.

For a few days at least, the selected fowls should be restrained of their liberty, and placed together in trios, in clean, well-sanded apartments, and fed with hard grains and some meat. Sound wheat, barley, rice, buck wheat, and cracked corn, mixed, are good. Feed moderately three times a-day, giving, besides, green feed in the morning and meat at noon. They should have pure water, frequently changed, and a good, large dusting box, in which fine sand is mixed with sifted ashes. Several days before sending away, examine the plumage with great care, washing off dirty spots; wash the faces, combs, and legs, using vinegar and water, or chlorinated soda (Labaraque's Solution), much diluted. It is well also to add a little tincture of iron to the drinking-water, to act as a tonic and prevent scours. The feathers of white fowls should be washed with white castile soap and water, rinsed in pure water and wiped nearly dry, being careful not to ruffle the feathers. Hemp seed or sunflower seed, if fed for a few days, will give a great gloss and brilliancy to the plumage. Birds that quarrel must not be shewn together.

When it comes to shipping, it is best to use a coop or hamper of moderate size, with plenty of straw in the bottom, and with small openings in the sides only for ventilation. A basket-hamper should be round and canvassed. A wooden coop or box should have a tight top so that nothing can drop upon the fowls from above. The water-cup should be fastened against one side, so high that no dirt will be thrown into it by the scratching of the fowls. If a thin piece of board shaped to fit is placed in the cup to float on the water, there will be less liability of spilling. It is well also to put in a small cabbage-head, or half of one. Part of a loaf of bread, fastened against the side, is the only solid food some fanciers send with their fowls when shipping them.

A TALK ABOUT EGGS.

THE demand for eggs is constantly increasing. Twenty years ago the average number of hens on our farms would hardly exceed twenty, perhaps not a dozen. Now the flocks vary from twenty-five to a hundred.

Then, the frugal housewife bought her tea, spices, &c., from the proceeds of the sale of the few left over and above the needs of the family. Now, eggs are an item of no little consequence in the profits of the estate, frequently adding to the credit side of the store-book a hundred dollars.

Then, if eggs sold at a cent a-piece, they were well sold. Now, they are never below a quarter of a dollar a-dozen at the East, and rarely below twenty cents at the West, and frequently during some winter months reach fifty, sixty, or even seventy-five cents a-dozen.

Taking the average of the egg market, when porter-house steak sells at from twenty-five to forty cents per lb., eggs are the cheaper food. Six Brahma or Cochin eggs will weigh 16 ounces, and can be had at an average, taking the year round, of from fifteen to eighteen cents, and one gets twice the weight of eggs for the same money that he would of steak.

On the other side of the ocean, the statistics of the trade are more complete than on this. The yearly importation of eggs into England reached, in 1861, 203⅓ millions in 1864, 335½ millions; in 1866, 430,878,880; in 1868, about 600,000,000; and it is presumed that in 1870 the sum total will reach nearly three-quarters of a billion.

The larger portion of these eggs came from France, and a few from Germany. The

laying season commences in France in January; April, May, and June produce the larger number. In July the quantity begins to lessen, improves a little in August and September, falls off again in October and November, while in the last month of the year the supply is alone kept up by drawing from stores preserved from the surplus of June.

All over the Continent, attention is being paid to the improvement in the breeds of fowls, and especially to the means of increasing the number of eggs which each hen deposits in a year. The houses are warmed by artificial heat, the most egg-producing and egg-suggesting food is given, and it is expected that the time is at hand when the yield from a single fowl, which by the old methods of feeding and care rarely reached to more than a hundred eggs a-year, will be double that number.

In our own country, attention is being given to this matter. We have not reached the perfection of France, or Galicia, or Austrian Poland, but we are in advance of England, and if we continue our present attention to this subject, shall soon be equal to the best of the European nations.

There is no question that the raising of eggs is a paying business. The few fowls that the farmer keeps in his barn-yard, and for which he expends little in grain over and above what they pick up, and which would be in a great measure lost but for them, pay the best; but when attention is specially paid to fowls, when they are housed and fed, and perhaps in winter warmed, after deducting the cost of keeping, care, interest, &c., from the amount for which their eggs sell, there is always as large, and, in nine cases out of ten, a larger balance on the credit side of the ledger than is found in connexion with any single department of farm industry. —*Hearth and Home.*

The Apiarian.

HOW TO RAISE ITALIAN QUEENS.

A CORRESPONDENT of the *Illustrated Bee Journal* raises Italian queens as follows:—"I make a box 6 inches square, and rabbet the top, front and back, and a good tight movable cover, and put in three or four frames, the top end longer, to hang on the rabbet, and a hole in the bottom for the bees to enter the miniature; the frames to have honey in, except the middle one, which must be dry comb; cut out a place in the centre 2 inches long at the top, and 1½ inch long at the bottom, and 1 inch wide; cut a half circle below that to give passage through for the bees, and a better chance to cluster around the eggs; cut a piece the same size that has eggs on both sides, and put it in the dry comb frame, and always put it in the centre. Never attempt to raise a queen only when drones are out. Put one quart of your bees in and a wirecloth over the hole, and then it is ready for the eggs; after putting them in, the work is done.

"I then put my miniature or what I make into my waggon, generally late in the afternoon, and carry them 2 miles from home, and set them about 40 rods apart, and take the wirecloth off and let the bees out; they find they are queenless, and have the material and commence at once to raise them a queen; they generally start several, and sometimes not any; I leave them three or four days, tack on the wirecloth after dark, and fetch them home; and fifteen or sixteen days from the time I give them eggs, a perfect queen comes out, and when six or seven days old she goes out to meet the drone; and when she lays, which is generally two or three days after impregnation, I put her in a cage about 3 inches long, made of wirecloth, the mesh not large enough for a bee to go through; the size about 1 inch around.

"I generally have a corn cob in each end for stoppers, and put them in a miniature prepared for them, with plenty of bees and honey, but no queen, and space enough between the frames and top to put in the queens that are caged. You can in this way keep as many queens as you please in the miniature all summer; and when I put one in a hive, first drive the bees out and find the queen and kill her, and then, if in a box hive, put the caged queen in the centre of the comb, and about 4 or 5 inches above the bottom, and press the comb against it so as to hold it, and put the bees back and leave for thirty-six or forty hours; then liberate her, and all is well.

"There are other ways, but this is the safest way, not liable to so many accidents in losses of queens. I find if I put a queen pod in a miniature or a hive, the bee invariably destroyed them, or the most of them; and if I want to save them, which is an item to the apiarist who raises queens, I put them in a cage and put them in the safest place in miniatnre.

VIRGIN QUEENS.

There will be no difference as to early laying between a queen raised in a large stock and a queen raised in a nucleus, provided the nucleus be strong enough to keep the brood warm.

The Naturalist.

THE GAD OR BOT-FLY.

WE extract the following from Louis Figuier's beautiful book, "The Insect World." For the cuts, we are indebted to the kindness of the publishers, Messrs Cassell, Petter, & Galpin :—

The genus *Œstrus*, the Gad, Bot-fly, or Breeze, comprises those formidable insects which attach the horse, the sheep, and the ox. The labours of Reaumur, in his admirable Memoirs, and those of M. Joly, Professor of Zoology to the Faculte des Sciences de Toulouse, who published some most valuable researches on this subject in 1846, will guide us in the following brief explanation.

The following is the description given by M. Joly of the Gad-fly (*Œstrus equi*), represented

Fig. 1.—Horse-fly, male (*Œstrus* (*gasterophilus*) *equi*).

Fig. 2.—Horse-fly, female (*Œstrus* (*gasterophilus*) *equi*).

in figs. 1, 2, which are taken from a drawing which accompanies that naturalist's memoirs.

The head of this insect is large and obtuse ; the face light yellow, with whitish silky fur ; the eyes blackish ; the antennæ ferruginous ; the thorax grey ; and the abdomen of a reddish yellow, with black spots. The wings are whitish, not diaphanous, with a golden tint, and divided by a winding band of blackish colour. The feet are palish yellow.

This species is found in France, in Italy, and also in the East, especially in Persia, and rarely in England. During the months of July and August, the *Œstrus* frequents pastures, and deposits its eggs chiefly on the shoulders and knees of horses. In order to do this, the female suspends herself in the air for some seconds over the place she has chosen, falls upon it, and with her abdomen bent, sticks her eggs to the horse's hair by means of a glutinous liquid with which they are provided, and which soon dries. This is repeated at very

Fig. 3.—Portion of the stomach of the horse, and larvæ of Œstrus (gasterophilus) equi.

short intervals. It often happens that from four to five hundred eggs are thus deposited upon the same horse. Guided by a marvellous instinct, the female *Œstrus* generally places her eggs on those parts of the horse's body which can be most easily touched with the tongue, that is, at the inner part of the knees, on the shoulders, and rarely on the outer parts of the mane.

Horses are much afraid of the attacks of these insects. Their skin contracts where the *Œstrus* deposits its eggs, and the effects of the bite soon become serious.

The eggs of the *Œstrus*, which are white and of conical form, adhere to the horse's hair. They are furnished with a lid, which, at the time of hatching, opens, to allow the exit of the young larva, which takes place, according to M. Joly, about twenty days after they are deposited. In fact, it is not in the egg state, but really in that of the larva, that the horse, as we shall explain, takes into his stomach these parasitical guests to which nature has allotted so

singular an abode. When licking itself, the horse carries them into his mouth, and afterwards swallows them with his food, by which means they enter the stomach. It is a remarkable fact that it is sometimes other insects, as the *Tabani*, for instance, that by their repeated stinging cause the horse to lick himself, and to thus receive the most cruel enemy. In the perilous journey they have to perform from the skin of the horse to his stomach, many of the larvæ of the *Œstrus*, as may be supposed, are destroyed, ground by the teeth of the animal, or crushed by the alimentary substances. There is hardly one *Œstrus* in fifty that arrives safely in the stomach of the horse, and yet, if one were to open a horse attacked by *Œstri*, the stomach would be nearly always found to be literally full of these larvæ. Fig. 3, taken from a drawing which accompanies M. Joly's memoirs, represents the state of a horse's stomach attacked by the Gad-fly.

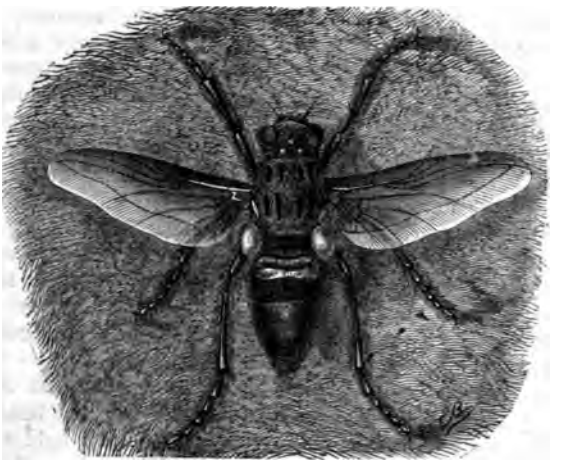


Fig. 4.—Bot-fly (*Estrus bovis*).

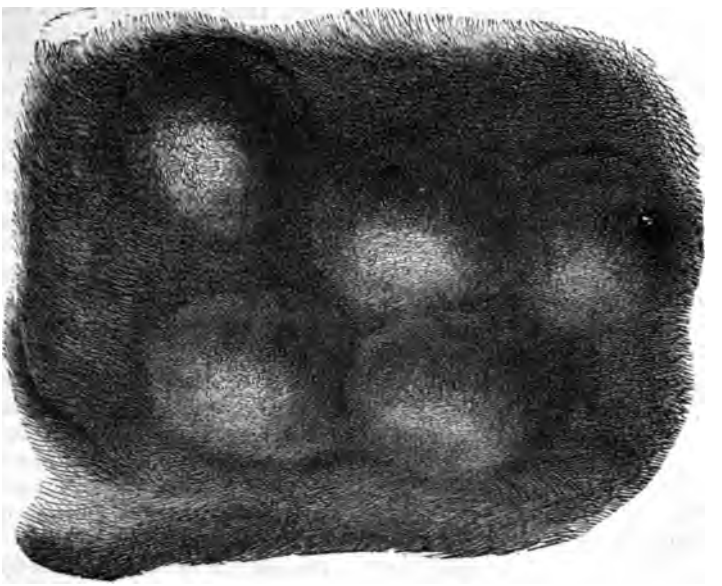


Fig. 5.—Bumps produced on Cattle by the larvæ of the Bot-fly.

The larvæ are of a reddish yellow, and each of their sedgments is armed at the posterior

edge with a double row of triangular spines, large and small alternately, yellow at the base, and black at the point, which is always turned backwards. The head is furnished with two hooks, which serve to fasten the larva to the interior coats of the stomach. The spine, with which the whole surface of the body is furnished, contribute to fix it more solidly, preventing the creatures, by the manner in which they are placed, from being carried away by the food which has gone through the first process of digestion.

It is probable that this larva, so singularly deposited, is nourished by the mucus secreted by the mucus membrane of the stomach, and that it breathes the air which the horse swallows with its food during the process of deglutition.

It must be acknowledged, however, that it is in the midst of a gaseous atmosphere which is very unhealthy, for nearly all the gases generated in the stomach of the horse are fatal to man, and to the generality of animals, as they consist of nitrogen, carbonic acid, sulphuretted hydrogen, and carburetted hydrogen. To explain how the insect can live under such circumstances, M. Joly has suggested the following ingenious hypothesis :—

"When the stomach which the larva inhabits," says this learned naturalist, "contains only oxygen, or air that is nearly pure, the insect opens the two lips of the cavity which contains the spiracles, and breathes at its ease. When the digestion of the alimentary substance generates gas which is unfit for respiration, or when the spiracles run the risk of being obstructed by the solid or liquid substances contained in the stomach, it shuts the lips, and continues to live on the air contained in its numerous tracheæ."

"Whatever may be the value of this explanation," adds M. Joly, "it is nevertheless very curious to see an insect pass the greater part of its life in an atmosphere which would be instantly fatal to most animals, and in an organ where, under the government of life, chemical processes bring about the most wonderful changes of the food into the substance of the animal itself. But how can the insect itself resist the action of these mysterious powers, and remain alone intact in the midst of all these matters which are unceasingly changing and decomposing? This is another question which it is difficult, or rather impossible, to explain in the present state of science, another enigma which humbles our pride, and of which He who has created both man and the worm alone knows the secret."

Arrived at a state of complete development, the larva of the *Œstrus* imprisoned in the stomach of the horse leaves the membrane to which it has been fixed, then directing the anterior part of its body toward the pyloric opening of the stomach, allows itself to be carried away with the excrementitious matter. It traverses, mixed with the excrementary bolus, the whole length of the intestinal canal, leaves it by the anal orifice, and on touching the ground, at once seeks a suitable place to go through the last but one of its metamorphoses.

The skin then gets thick, hardens, and becomes black inside. All the organs of the animal are composed of a whitish amorphous pulp, which soon assumes its destined form, and the insect becomes perfect. It then lifts a lid at the anterior part of its cocoon, emerges, dries its wings, and flies off.

The Bot-fly (*Œstrus bovis*, fig. 4) has a very hairy body, large head, the face and forehead covered with light yellow hair, the eyes brown, and the antennæ black. The thorax is yellow, barred with black; the abdomen of a greyish white at the base, covered with black hair on the third segment, and the remainder of an orange yellow; the wings are smoky brown.

As soon as the cattle are attacked, they may be seen, their heads and necks extended, their tails trembling, and held in a line with the body, to rush to the nearest river or pond, while such as are not attached disperse. It is asserted that the buzzing alone of the *Œstrus* terrifies a bullock to such an extent as to render it unmanageable. As for the insect, it simply obeys its maternal instinct, which commands it to deposit its eggs under the skin of our large ruminants.

Let us now explain how the eggs of the *Œstrus*, deposited in the skin of the bullock, accommodate themselves to this strange abode. The mother insect makes a certain number of little wounds in the skin of the beast, each of which receives an egg, which the heat of the animal serves to bring forth. It is a natural parallel to the artificial way which the antient Egyptians invented of hatching the eggs of domestic fowls, and which has been imitated badly enough in our day.

Directly the larva of the Bot-fly is out of the egg and lodged between the skin and the flesh of its host, the bullock, it finds itself in a place perfectly suitable to its existence. In this happy condition, the larva increases in growth, and eventually becomes a fly in its turn. Those parts of the animal's body in which the larvæ

are lodged are easily to be recognized, as above each larva may be seen an elevation, a sort of tumour, termed a bot—a bump, as Reaumur calls it, comparing it more or less justly to the bump caused on a man's head by a severe blow.

Fig. 5, taken from a drawing in Reaumur's Memoirs, represents the bots of which we speak.

The country people are well aware of the nature and cause of these bots. They know that each one contains a worm, that this worm comes from a fly, and that later it will be transformed into a fly itself. Each of these bots has in its interior a cavity, occupied by a larva, which, as well as the bot, increases in size as the larva becomes developed.

It is generally on young cows or young bullocks—in fact, on cattle of from two to three years of age—that these tumours exist, and they are rarely to be seen on old animals. The fly, which by piercing the skin occasions these tumours, always chooses those whose skin offers little resistance. Each tumour is provided with a small opening, by which the larva breathes.

In order to examine the interior cavity, Reaumur opened some of these tumours, either with a razor or a pair of scissors. He found it in a most disgusting state. The larva is lodged in a regular festering wound, matter occupying the bottom of the cavity, and the head of the worm is continually, or almost continually, plunged in this liquid. "It is most likely very well off there," says Reaumur; and he adds that this matter appears to be their sole food.

"The position of a horned beast," observes the great naturalist, "which has thirty or forty of these bumps on its back, would be a very cruel one, and a terrible state of suffering if his flesh were continually mangled by thirty or forty large worms. But it is probable they cause no suffering, or at least very little, to the large animal." "Besides," continues Reaumur, "those cattle whose bodies are the most covered with bumps, not only shew no signs of pain, but it does not appear that they are prejudicial to them in any way."

"Nature," says Reaumur, "has taught this worm the surest, the gentlest, and the most simple of methods, the one to which surgeons often have recourse to hold wounds open, or to enlarge them. They press *tents* into a wound they wish to enlarge. Two or three days before the worm wishes to come out, it commences to make use of its posterior part as a tent, to increase the size of the exit from it habitation. It thrusts it into the hole and draws it out again many times in the course of two or three days, and the oftener this is repeated, the longer it is able to retain its posterior end in the opening, as the hole becomes larger. On the day preceding that on which the worm is to come out, the posterior part is to be found almost continually in the hole. At last, it comes out backwards and falls to the ground, when it gets under a stone, or buries itself in the turf; remaining quiet and preparing for its last transformation. Its skin hardens, the rings disappear, and it becomes black. Thenceforth the insect is detached from the outer skin, which forms a cocoon, or box. At the front and upper part of the cocoon is a triangular piece, which the fly gets rid of when it is in a fit state to come into the open air."

Fig. 6, taken from drawings in Reaumur's

Fig. 6.—Imago of Bot-fly emerging.

Fig. 7.—Ovipositor of the Bot-fly. (*Œstrus bovis.*)

Memoirs, represents the imago of the *Œstrus* leaving the cocoon.

The reader is, most likely, desirous to know with the aid of what instrument the *Œstrus* is able to pierce the thick skin of the ox.

The female only is possessed of this instrument, which is situated in the posterior extremity of the body. It is of a shiny blackish brown colour, and, as it were, covered with scales. By pressing the abdomen of the fly between one's fingers, it is thrust out. Reaumur observes that it was formed of four tubes, which could be drawn the one into the other, like the tubes of a telescope (fig. 7). The last of these appears to terminate in five small scaly knobs, which are not placed upon the same line, but are the ends of five different parts. Three of these knobs are furnished with points, which form an instrument well fitted to operate upon a hard thick skin. United together, they form a cavity similar to that of an auger, and terminating in the form of a spoon.

THE OAT PLANT.

ALL interested in Natural History owe a deep debt of gratitude to Messrs Cassell, Petter, & Galpin for the splendid way in which that firm has placed within easy reach of all readers the works of M. Louis Figuier. From "The Vegetable World" we extract the following regarding the root crop. For the cuts we are indebted to the kindness of Messrs Cassell, Petter, & Galpin.

The important family of grasses, to which the oat-grass belongs, supplies us also with wheat, rice, rye, barley, maize, and the sugar-cane ; and constitutes, besides, the grass of our meadows and our hill-sides. The oat is an annual, the lower stem of which forms a short rhizome, from which secondary stems emanate ; these are interrupted by brown inflated nodes or joints, which become solid, whilst the parts intervening between the knots are hollow tubes. From these knots spring the leaves. Their petioles form a split sheath on one side, which embraces the stem for some distance before spreading into a very long slender leaf, traversed by parallel and simple veins, converging towards the summit. At the point where the leaf separates from the sheath, we find a small, whitish, membraneous band, which appears to be a continuation of the inner lining of the petiole beyond the origin of the lamina of the leaf. In the accompaning engraving (fig. 1), of an annual grass, *Poa annua*, *s* is the sheathing petiole, called *ligula* (shoe-latchet), *l a* the lamina, *n* the tumid node, at which the leaf originates.

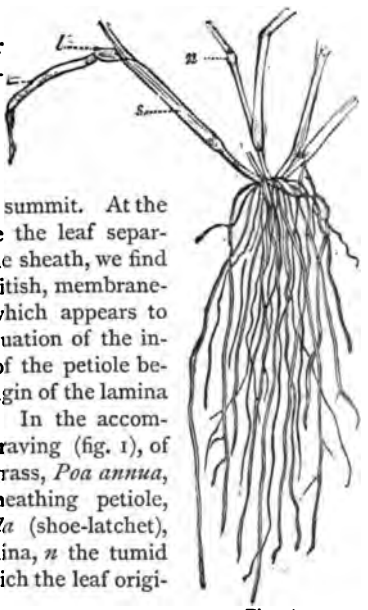


Fig. 1.

The inflorescence of the oat is a loose, but ample panicle, displaying branches on all sides. If we examine more closely these little fructifying pendants, two pointed scales will be observed almost equal in size, one of which is inserted a little lower than the other ; this constitutes the envelope, pro-

Fig. 2.

tector, or glume of three distichous flowers forming a little ear or spikelet (fig. 3). Th

wer is fully developed, the second is ınd the third rudimentary and sterile. amine the lower flower, it is composed ;y of three stamens and a pistil. The ; of the stamens are delicate, and the which are in the shape of an X, are ttached by the back. The pistil is com- f a shaggy, hairy ovarium, which sur- he feathered styles. There is only one the interior, containing a unique and :l ovule. These essential organs are l by a system of two scales, the external :t of which bears upon its back a ; and rigid filament, slightly bent, while rnal one, which is much smaller, is with two lateral veins.

the ovule has been subjected to the ; influence of the pollen-tubes, it is ıed into a seed, which presents this peculiarity, that it is blended firmly with the fruit by its integument in such a manner as to constitute what botanists call *caryopsis*—a term used when the pericarp of an indehiscent seed-vessel is membraneous, and adheres firmly to the integument, as in fig. 2, which represents a caryopsis of buckwheat (*Fagopyrum esculentum*) seed itself. The greater part of this is composed of a farinaceous which is often confounded with the albumen. On the outside and beneath, a small distinct body is perceptible, sunk in the surface, and scarcely projecting from it. This is the embryo, which, supported on the albumen by it, forms a cushion-like enlargement by the lateral expansion of the stalk.

Fig. 3.

TAME COD FISH AT PORT-LOGAN.

. FRANK BUCKLAND gives the following description of a visit to M'Douall's tame fish pond at Port- from which the Colonel supplies his

an House is situated on a narrow land, which terminates in the Mull way, one of the wildest spots in the On the east side of the colonel's Luce Bay, and a view of the distant Head, which, with the Mull of Gallo- ms the outpost sentries of Luce Bay. :r we had transacted some business, nel most kindly took me to see his d. On the Glenluce side of the pro- e coast is exceedingly rocky, remind ɔf the pictures of the Norway coast. e bottom of the garden the sea has l out of the solid rock a kind of eatre about 100 feet in diameter; for- here was an iron grating to prevent from going out; but now the passage d by a simple wall of loose stones, which the water can come in, but the ınot get out. The tide comes into arkable chamber through a chasm in the rocks about 6 feet in width. The water in the chamber is of considerable depth, and the tide ebbs and flows through the chasm, thus changing the water regularly. The tide was out at the time of my arrival, but the pond was full of the most beautiful emerald clear sea water. The colonel has built some steps so as to get down to the pond from the level of the ground above, and he has also made a path around the edge of the pond.

Standing on the top of the steps, I could perceive some dark looking bodies deep down in the water below. As we descended, these bodies began to move, and arriving at the edge of the pond, I saw a sight which was worth while coming all the way from London to behold. From almost every side of the pond, and from its deepest bottom, came darting towards us great open-mouthed cod fish. They seemed really to know personally, Mrs Towdie, the woman who is appointed as curator of the pond. She threw a mussel without its shell into the middle of pond, and in a moment the surface seemed literally boiling with struggling fish. Gradually she threw the mussels nearer and nearer

to the path where we were standing, and the fish followed them. I asked the colonel to send the woman away, but to leave her mussel basket, in order that I might make my observations quietly; and this I did under great difficulties, as it was blowing a gale of wind, and raining cold rain in torrents.

I feel convinced that fish—at least Colonel M'Douall's cod fish—have an intelligence for which we never give them credit. A cod's head and shoulders boiled and put on the table, with its forlorn and woe-begone features, is a very different thing from the head of a hungry cod in perfect health looking for his dinner. The eye has great power of motion, great quickness, and I should say an almost telescope vision—in water, this of course. Again, the cod carries his three barbels or feeders on his lower jaw stiffly protruded in front of his jaw, like the antennæ of an ant. They are exceedingly sensitive, for the moment I attempted to pinch one of them, the cod drew back smartly. Among the other fish is a cod who has only one eye, but that is a piercer; they call him "Blind Tom;" this old fellow came sailing round and round with his blind eye towards me to touch one of his feelers; it was a case of "threes about" in a moment, and when he turned round again, the old boy's solemn, half frightened face and indignant glance of his one eye were most absurd.

Having plenty of mussels and keeping very quiet, I made friends with these dear cod fish. They all came quite up to the edge, just like chickens, to be fed. In their anxiety to get the food, they thrust their heads quite out of the water, and occasionally an energetic fish actually scrambled up the sloping side of the rock for a mussel; but he never came so far but that his tail was in the water. They took the mussels with a tremendous gulp, making a gulping noise like the last sighs of a pail of water as it retires down a sink hole; and here for the first time I found out that a fish has power, by means of his gills, to create an indraught of water towards his stomach, so that he does not depend entirely on his lips to seize his food.

After a time the cod and I became such friends that they took the mussels out of my hand, and then I got another lesson as to the power of a fish's jaws. I held the mussel in my fingers and let them swallow my hand; their mouths were big enough to take it up to the wrist. Nobody can have any idea, unless they have tried it, of the tremendous power of a cod's jaw.

The rascals can nip uncommonly hard; their little rough, file-like teeth can hurt considerably; the bite amounts to a good sharp pinch, with a decided touch of saw-like motion; these pinching muscles are the part of the cod's head so good to eat.

A very curious thing occurred: when the mussels were all gone, I fed the cod with bits of paper, pieces of tobacco, official red tape, bits of my mackintosh, &c.; but they only came up to these things, and then refused them. Suddenly I recollected that I had a dead viper in my pocket, which I had picked up that morning in the middle of the carriage road, with his back broken by a wheel, just at the point where the Scotch Commissioners have fixed the eastermost limit of the river Luce, on the opposite side of Luce Bay. I took the viper out of my pocket and waved it about with a snake-like motion in the water. To my great surprise, the cod all *swam away* from it. I even tried the hungry little cod, who had been jostled out of the "soup kitchen" by the bigger fish; but, no! even they turned up their tails at the viper. I tried them two or three times; always with the same result. At last one big fellow came up from the bottom like a rocket and swallowed at a gulp about half of the viper. I pulled at the viper's tail, and the cod pulled at his head; he was a tough viper, or he would have come in two. At last the cod let go, as though he had found out that this was not his proper food.

Hunting, Fishing, and Shooting.

SCOTCH SALMON FISHING.

THE *Times*, in reviewing the Scotch Salmon Fishing of the past season, ays :—

The past salmon fishing season in Scotland as not, on the whole, been very productive. Although in one or two districts the capture of sh has been above an average, the season on ome rivers has been the worst known for many ears. The long drought seriously affected the ake of salmon in the upper fisheries. Owing to he low state of the water during the greater ortion of the year, the fish were prevented from scending the rivers and distributing themselves hroughout the upper waters. The autumn oods, however, brought up an immense quantity f fish, and during the last few weeks of the ngling season a fair number of salmon was aken. In one particular the salmon season of 870 in Scotland has been very remarkable. In o previous year have so many heavy fish been rought to land, and if the season has not been ery productive in regard to the quantity of fish aken, it certainly has been remarkable in regard the number of large fish which have been aptured. The preservation of kelts has, no oubt, been the chief cause of the increase in onster fish. From the Tay district, we learn at both loch and river have yielded an extra- rdinary number of large fish this year. Salmon nging in weight from 26 lb. to 30 lb. have been ry numerous, while the capture of salmon eighing upwards of 50 lb. has not by any means en of uncommon occurrence. In Mr Buck- nd's Museum of Economic Fish Culture at outh Kensington, there is a cast of a salmon hich was caught in the nets below Newburgh, June last, which turned the scale at 70 lb., hile a gentleman landed, in March last, with d and line, on the Stanley water, a splendid lmon of 61 lb. Besides these monsters, fish the following weights were taken in the Tay strict this year :—55¾ lb., 55 lb., 52 lb., 50 lb., lb., 42 lb., 39 lb., 38 lb., 36 lb., and several hers, ranging from 30 lb., to 35 lb. Many of the t fisheries on the upper portions of the Tay suffered considerably from the drought. The middle and lower stations, however, did very well, and several of the tacksmen are reported to have had a successful season. The angling season on the Tay was one of the worst on record. During most of the year the water was very low, and although salmon were not scarce, they were very shy, and would not rise to the fly. On the Tweed, the fishing, both by rods and nets, was very poor. As on most other rivers throughout the kingdom, want of water more than anything else was the chief cause of bad sport. A good number of large fish, ranging in weight from 30 lb. to 40 lb., were, however, taken in the Tweed during the past year. The accounts from the River Forth are more satisfactory ; the season is reported to have been, on the whole, productive. The lower fishings all did well (some stations yielding more fish than in any former year), and although the summer fishing on the upper waters fell considerably below an average, the spring fishing was good. This river also produced some fine fish this year, the two largest weighing 56½ lb. and 50 lb. On the Dee and Don the season has been a good one. The number of salmon taken on the Spey has been below an average. Many heavy fish were, however, landed, and the angling during part of the spring and autumn was pretty fair. The season on the Ness was a poor one, the fishing on the upper waters being the worst known for many years. On the Nith, the net and coble fishing was successful, but the amount of fish taken in the upper waters was very small. The returns from other rivers are all of a like nature. While the lower fisheries generally did pretty well, the upper water fishing, as a rule, was very poor. During the last few weeks there has been a great run of fish up the rivers. The late heavy rains have brought the rivers down in flood, and the salmon had no difficulty in passing upwards. There is every prospect that the spawning beds will be stocked with a full complement of breeding fish this year.

The Special Commissioners, Messrs Buckland and Young, who were appointed to inquire into

the effects of recent legislation on the Scotch salmon fisheries, have now concluded their important inquiry, and shortly, we understand, a report will be issued on the subject. We are glad to learn that the Commissioners were well received in Scotland, and every assistance was given them by proprietors, lessees, and others interested in the welfare of the salmon fisheries. The Scotch salmon fisheries are not, it would appear, in a very satisfactory condition. Many miles of valuable spawning grounds being shut, by natural obstructions, to the ascent of fish, the Commissioners have inspected the falls of the Tummel, Spean, Shin, Lochy, &c., and have expressed an opinion that at comparatively little expense salmon can be made to surmount these formidable barriers. Mr Buckland has already made one or two successful alterations in defective fish-ways on the Scotch rivers, the most important of which have been at the docks on the Dee, and at the canal on the Nith, at Dumfries. Of the many evils which retard the increase of salmon in Scotland, perhaps the worst of all are the fearful pollutions from manufactories, sewage, &c., which are allowed to flow unchecked into the rivers. In several instances, so great is the pollution that it becomes a question of health rather than a question of fisheries. Some very bad cases came under the notice of the Commissioners during their late inquiry. At a coal pit on the River Doon, in Ayrshire, the water pumped into the river was the colour of blood; the stones in the river were covered with a thick red powder, and the fish were killed for 20 miles down stream; even eels and fresh-water mussels succumbed to the deadly poison. Sewage from towns also does an immense amount of injury to the fisheries. Both these evils, however, can be easily remedied. The water used in manufactories may, in most cases, the Commissioners consider, be returned to the river in a pure state, and at a profit to the manufacturer; while town sewage might be utilized in many districts in Scotland to a very considerable extent. Much attention has been paid by Messrs Buckland and Young to the laws regarding the various kinds of nets used in the Scotch salmon fisheries, and the placing of gratings at the head and tail races in mill-dams. The law regarding gratings in mill-dams is of much importance, and if properly carried out would, in no way, interfere with the mill-power, and would save thousands of smolts from being killed when coming down the rivers in spring, and also many of the parent fish when ascending the rivers in the autumn.

The weekly close time, formation of district boards, and other matters of much moment, have also been brought under the consideration of the Commissioners, who, we are glad to hear, have on every occasion taken pains to impress upon the upper and lower proprietors the desirability of their working in harmony for the general good of all along the river. We trust some satisfactory arrangement may be made, not only in Scotland, but also in England, whereby the upper proprietors may be enabled to secure some return for the trouble and expense they incur by protecting the breeding fish while on the spawning beds. At present the lower proprietors reap all the advantage of the careful preservation of the upper waters.

The salmon fisheries of Scotland are one of the most valuable natural products of that country, but the increase of population and manufactories have somewhat interfered with the development of this valuable industry; and admitting that the salmon laws have been productive of much good, the general opinion throughout Scotland appears to be that, with some amendments in the present laws, the rivers of Scotland might be made to produce a far larger amount of salmon than they do at present.

A DAY ON AN IRISH MOOR.

the dark hour before dawn of a December morning, the moorland fowler shivering, into the gloomy car that in ıd is called covered. His way is gh the street of an old ramschackle in which a dank sea-fog muffles the amps, while his vehicle is at every ɜnt interrupted by the warning shout of sant driving a sort of tumbril full of ntended for sale at the monthly market on the edge of the borough. Though ay has not yet broken, the pig fair is in ɜwing: lights twinkle from the tents, ntractable grunters are growling and ıking on all sides, the road is blocked dgate Hill fashion by a congestion of : unmistakeably of a Celtic and agricul- character. And now the sportsman es towards the ascent to the moors, ɔuntains, as they are termed in the dis-

From the summit, he can see a faint tinge chilling out the stars in the east, he knows that the grey dim expanse neath is the side to which even thus certain wading birds are wending their and exchanging pass-words and chals with each other overhead. Gradually, they had been muffled in brown hol- and then stripped by degrees, the ɜ-rows, the dark plumes of the fir, the ıed cattle and sheep, the dirty pictue cabins, come into view. Day arrives t, sulky and reluctant. The moor-fowl er has reached his starting point where haun Ruadha (Red John) awaits him the dogs. The covered car is con- d with its coachman to the hospitality farmer resident on the skirts of a ıesert, on which four lean kine are wist- meditating on the miseries of starvation. farmer himself wishes the shooter "good " while Shaun, eager as the setters for ɔort, twirls in his hand the "taste of a " with which he is wont to beat for a ɔr a cock in the way of business, or to employ for recreation in a humorous skull-breaking game, which not unfrequently comes off at the cross-road village beyond. Shaun thinks it better to charge with heavy shot, and steals as quietly as possible towards a sure find that he knows for wild ducks. A snipe, bleating loudly, starts from the rushes, but the nobler quarry in prospect has saved him from a chance of being the first tenant of the day's bag. A loutish heron, with a bronchitic snuffle, flops out of a ditch. The fowler and his henchman dread that the whutter made by the long-legged angler will frighten the mallards and their nervous companions; but no, if they are here they have not taken any notice of either heron or snipe. The fowler has directed that Bob and Nell, the setters, should be tied, and kept in hand by Shaun, as the patter of their feet might discover the movement projected. Alas! this piece of strategy is fatal to the success of the undertaking. Bob is shaking and trembling with sheer excitement, and for his very life cannot suppress a whimpering petition for release to join actively in the fun. At the instant there is a rush of pinions, and seven wild ducks have put themselves well out of shot before their whereabouts has been distinctly ascertained. And so there is no longer any use in keeping in the dogs, and they commence to range the soaked and soddened marsh. Bob has only coursed round a single turn, when he throws his head aloft, and then marches gravely to a solitary tuft of tall bog-grass, and becomes as fixed as marble before it. Nell from afar off imitates his deportment, and then Shaun advances to perform his part, and as he thwacks the grass, puss dashes from her retreat, and at 30 yards is stopped with the best part of 1¼ ounce of No. 8.

Why does Shaun of a sudden (he not being at all in the line of fire) tumble flat on his face, and begin to whistle like the imitator of birds who used to be retained at Evans's

before knife-swallowing was encouraged on the stage of that establishment? Behold! in the air a great army of golden plover already hearkening and replying to the shrill, querulous piping of the Ballinaheila Joel. The squadron has its scouts, its Uhlans, its wary videttes, but is withdrawn so far from earth at present that it defies attack, and is engaged perhaps in a grand reconnaissance of the barren stony parish over which it wheels and cries. Shaun, *ventre a terre*, continues to whistle, and at length his perseverance is rewarded by a detachment of the birds floating down in narrowing circuits responding to his call. Nearer and nearer the doomed contingent approaches to where Shaun and his watchful master are in readiness to receive them; their comrades in the clouds suspect that matters are not right, and begin to clamour in a warning key to the rash division that has parted from them. Bang! bang! four down; and a fifth winged who has just fallen into yonder pool.

Here the moorland is comparatively dry. It is covered with withered ferns and broom, and at the pressure of the foot yields a perfume of new mown hay and cinnamon. At times you meet a bunch of some sort of berry, the name of which would be more useful to poets than the cherries they compare the lips of fair women to, and the burning red contrasts finely with the tints of the heather and the scattered blocks of moss-crusted granite. Shaun observes none of these things, but practically remarks that, "Av there's a cock in the wurrld, there's won to be got in the neighbourhood," and he proceeds to trample and flog briar and bramble, and roar, "Hie, cock! hie, cock!" with vehemence, until he abandons the exercise through sheer exhaustion. The dogs are not able to do much on account of the tangle of thorns, but just as Shaun temporarily rests from his labours, both are setting on the barest track in the place. "'Tis a cock, for sartain," whispers Shaun, "and mebbe two. Steady, Bob!" Bob is as steady as a rock, Nell backs with a rigidity of manner that is admired after its fashion in a duchess as well as in a setter, the moor fowler, with hand on trigger, is prepared for the flushing of a glorious addition to supper, and a wretched Jack-snipe jerks from under Bob's nose, and goes away unmolested. Later on, however, fortune is kinder to the sportsman, and a couple of cock reward him for his perseverance, together with two brace of snipe. These birds, with changes of weather, shift their haunts from the low marshy grounds to the drier uplands, but frequent the moist grounds during the night. Shaun could tell you accurately enough the habits of snipe, and though unable to bring them down with a gun, will never fail to procure a number of them to order. The rascal snares them with ingeniously planted rods, on which the snipe are made literally to hang themselves, and you may occasionally find a dozen of the engines pitched close to an oozing spring situated within the range of Mr Shaun's usual wanderings. The fellow will only spend powder and shot on wild duck or on the golden plover; among the latter he makes tremendous havoc in strong gales, or at eventide, when he creeps to the lonely side of the mountain on which the birds assemble for the night.

The moorland shooter in December must not expect the comfortable proportions of game which are almost assured to the fowler who takes a grouse-stocked moor in August. The prospect of a good bag is always near and probable enough to give an interest to the expedition for making it, while the chances of complete failure impart a zest to every little success achieved. When the dusk has warned the fowler off the hills, he counts over with Shaun a couple of woodcock, a heavy duck, a teal, three brace of plover, four of snipe, a hare, and a green plover (pewit); and then departs into the gathering gloom, with an appetite for dinner that is in itself worth coming from Pall Mall to Rhein Dhur to experience. How long the road seems, how slow the horse!—*Pall Mall Gazette.*

The Country Gentlewoman.

WAX-FLOWER MAKING.

MISCELLANEOUS FLOWERS.

(Continued.)

ONE of the first-named of these should decidedly have been the Camellia, but t must be none the less despised for ranking is one of the last on my list of beauties for imitating, as it is particularly adapted for that purpose. The flower itself consists of about seven rows of petals, which must all be cut from the thickest wax, and moulded flatly, with a slight indenture in each petal, made by placing the thickest steel pin down the centre of each. There are a variety of colours in Camellias, the self-coloured ones, in my opinion, being far more important looking than the mixed or striped ones. Crimson, pink, and white are the best colours for imitating in wax, as the exact tints can be easily obtained. The striped ones require more talent in shading off the colours to a nicety. The single Camellias in each colour look exquisite when made; the more simple the flower, the prettier the effect.

Garden flowers of many descriptions, such as verbenas, mignonette, stocks, gladiolus, &c., are not so stiff in appearance as many of the hothouse flowers, and placed in a group, and artistically arranged amongst the rarer beauties, will be found to present a very charming effect.

Stephanotis floribunda—a stove climber—will be found a great acquisition in the arrangement of vases and baskets. In order to be effective, it should not be sparingly used; a nice spray of its flowers and leaves intermixed form a pretty handle to a basket, and bunches of its white flowers, which grow in clusters several in number together, look equally well intermingled with the bright colours of other flowers.

Dipladenias and Allamandas are uncommon in wax, and are tedious to make, on account of the tubular shape of the flower. The corolla is monopetalous, and the expanded portion divided into segments, and rolled back. Now, in wax, of necessity each, in order to be well formed, must be cut separately, and afterwards so neatly joined as not to be perceived by the eye, or the natural effect will be spoiled. There are several shades of colour in these flowers, the deep coloured ones being the most showy.

Gladioli spikes are almost too long to arrange conveniently with other flowers, but they can be mounted singly, in which manner they will look well; or a vase filled with the various kinds, and some of their flag-like leaves arranged with them, would be a novelty amongst the groups of other flowers.

Clematis of various kinds are useful in the arrangement of flowers, and look pretty when made in wax; the common single white one (C. vitalba), to be seen so abundantly climbing round the cottager's porch, is a light artistic-looking little flower for placing in a group; and, although so small, will be found quite simple to model. Clematis Jackmanii, on account of its rich violet colour, is admirable for modelling, as are also the lavender coloured ones, both single and double.

Among the stove beauties adapted for wax modelling is the charmingly pretty Euphorbia jacquiniflora, its wreaths of orange scarlet flowers forming a pretty contrast, as a climber, with the white Stephanotis; its flowers, though small, are of thick substance. The flowers of E. splendens are not quite so bright in colour, but are equally showy, and, instead of being in long sprays, are produced in clusters, and mix well in a group of large flowers.

THE MODELLING OF MISCELLANEOUS BULBS, WITH HINTS ON ORCHID BLOOMS.

Bulbs are now in season, and are generally great favourites, particularly with the

ladies. As they are so suitable for in-door cultivation, I think it will be well to describe a few for modelling in wax, in order to have a good display of flowers at all times of the year. The hyacinth, in its numerous colours, will always be a favourite in wax; and, although it requires much time and perseverance to produce a good specimen, it is well repaid by the great gratification experienced at such a result. The double ones can be easily made, but their small petals require care in moulding and colouring to a nicety. They can be formed as if luxuriating in a fancy pot or basket of moss, by having one spike of flower and a little foliage round it, and arranging them in the centre of the pot or basket employed. The flowers should be made from medium wax, and the colour for the dark kinds well rubbed into it; some of them will require shading off towards the edges. The stalk of the flower should consist of two or three pieces of the thickest wire fastened together and then covered with wax, or the required thickness cannot be obtained. Crocuses in yellow, violet, or white, are very pretty when modelled, and their grass-like foliage light and artistic-looking in a group. Snow-drops, both single and double, are little gems; pots of these, also, look well under glass shades. Jonquils and narcissuses make a nice variety amongst other flowers. The white ones, with a yellow cup in the centre, are the easiest to imitate; but the white and cream-coloured ones look the prettiest, and are the most showy-looking when done. The curiously-shaped flowers of the genus Cyclamen, that are now so popular, will be found equally easy to model, and their various shades of colour to harmonize well with flowers of deeper hue.

Having said this much on bulbs, I think I cannot now do better, as this is my concluding chapter, than describe a few orchid flowers suitable for modelling in wax. Among the best for that purpose I find Calanthes, Cattleyas, Dendrobiums, Lœlias, Phalænopsis, and Sophronitis. Cattleya Mossiæ and its varieties will be found a handsome acquisition to a group. Although there are many others that look equally well, yet I believe this is one of the easiest to procure. The colour, which is generally shaded off to a paler colour at the edge, varies from white to violet: some are rose-coloured; they mostly have orange-coloured throats. The petals should be cut from the thickest wax, well moulded at the edges, and then crimped; the lip should be cut from the same, and also well moulded and crimped. Dendrobium nobile is a charming flower, and of a splendid colour; it will be found rather more tedious to model than the yellow-tipped one (Dendrobium chrysanthum), which flowers in long drooping spikes, one or two branches of which relieve the larger flowers; the petals are a pale mauve colour. The Phalænopsis flowers, both amabilis and Schilleriana, must be cut from the lily-wax, or the bold manner in which their petals stand out cannot be imitated. Sophronitis grandiflora is one of the most showy-looking in a group, on account of its beautiful bright crimson colour. This may be cut from medium wax, and coloured with a mixture of carmine and scarlet.

In forming a group of orchids, the foliage of some kinds that are light-looking must not be omitted. They may be introduced in a vase of different flowers, but one entirely devoted to them presents a superior appearance.—*Annie M. Williams.*

THE

;NTRY GENTLEMAN'S MAGAZINE

FEBRUARY 1871

RETROSPECT.

: weather of January 1870 was ex-
remely variable and trying to agri-
s. The beginning of the month was
rized by rain and snow; while frost,
in, and snow were all severely felt
the middle and end of the month.
rn trade was in an unusually de-
state. Throughout the country, a
state of inactivity and absence of
ion were noticeable, although the
rices were very fair; 45s. to 48s.
: obtained for new, while old samples
sold at 53s. The beef market also
in a marked degree, of the depres-
ıced by the corn market. Both north
h, the trade was inanimate, notwith-
that the supplies were frequently
The general prices throughout the
vere:—prime large oxen, 4s. 8d. to
; prime Scots, 5s. to 5s. 2d.; South-
;s. 6d. to 5s. 8d., per 8 lb. The
health of stock during the month
:he whole, very fair.

eather in England during February
leasing contrast to that of January;
Scotland a continuation of the pre-
ɔnth's unsettled weather was experi-
In England, and in Scotland also, in
he unfavourable weather, the season-
ɛ of the farm made great progress.
ı trade continued in the same dull
eculative state, although there had
ed, both in the metropolis and also
ɔuntry centres, a slight rise in the
prices. The live-stock trade during this month was lively and animated, with prices in favour of sellers. Many outbreaks of foot-and-mouth disease were reported.

Ploughing during March was carried on with much vigour, the weather continuing throughout the month very favourable for agricultural operations. The lambing season commenced under somewhat unfavourable auspices, the unusual scarcity of grass, coupled with cold weather, rendering it dangerous. A good business was done in the corn markets. The demand and value improved, and consumption appeared to go on to a full extent. An advance of from 1s. to 2s. was noticeable in most of the country markets. The beef trade during the month again relapsed into inactivity. Influenced by warm weather, the heaviness in the dead meat market, and the increased liberality of the foreign and home receipts, prices shewed a reduction of 2d. per 8 lb. Many serious outbreaks of foot-and-mouth disease and pleuro-pneumonia were, during this month, reported. In Dorchester and Lancashire, both these diseases were especially virulent.

Although in the early part of April the weather was warm and genial, towards the middle and close a sudden change set in, with the appearance of frost. Wheat suffered much, many fields throughout the country having to be re-seeded. Throughout the month, corn markets were quiet, holders submitting to a reduction of 1s. per qr. whenever sales

were pressed. The averages in London, at the close of the month, were:—Wheat, 45s. 1d.; barley, 35s. 4d. The beef trade throughout the month was variable—at times animated, at others much depressed. Thirty-eight counties in Great Britain, at the end of the month, were infected with pleuro-pneumonia, and the centres of disease numbered no fewer than 132. Foot-and-mouth disease had disappeared from some countries in Europe, though it still lingered in Lombardy.

A welcome re-action in the weather took place during the month of May, the hitherto cold and ungenial atmosphere being succeeded by balmy airs and bright suns. All farming work was got well through, and the refreshing showers that alternated with the sunshine imparted to our meadow lands renewed vigour, thereby affording a good bite to cattle. Our home corn markets during the month were firm, and although further advances on the prices of wheat were only made occasionally, holders refused business at any decline. Some of the country markets, however, reported an advance of 1s. The prices at the close of the month were:—Wheat, 47s. 6d.; barley, 35s. 4d. The beef trade continued much the same as that of the previous month. Prime oxen fetched 4s. 6d. to 4s. 8d.; prime Scots, 4s. 8d. to 5s.; and prime Southdown sheep, 5s. 2d. to 5s. 4d., per 8 lb.

In every respect the weather of the month of June was extremely favourable to agriculture. About the beginning of the month a genial and general fall of rain improved the country, while towards the middle and end of the month, sunshine and rain were each experienced to great advantage. The corn trade during this month was lively, and prices advanced 1s., and in some places 2s. The cattle trade was active at the opening of the month, and continued so all throughout. Good prices were generally well supported.

Throughout the whole of the month of July we had a period of warm forcing weather, which, combined with the genial effects of previous rains, gave a great impetus to all growing crops. Although one of the most disastrous and most unnecessary of wars that ever took place, broke out during the month between France and Prussia, no material change in the price of corn in the country was evident. Indeed, the value of wheat, instead of rising, took an opposite course, and at the end of the month it was found that prices were, throughout the country, from 6d. to 1s. less than those with which the month was ushered in. Not so the cattle trade, which gave out unmistakeable signs of animation. Proceedings were active, while the quality of the animals was generally good.

During August, the scarcity of rain began to tell terribly upon the surface of the country. Although cereal crops were quickly brought to maturity, and the farmer had fine dry weather wherewith to gather in his harvest, yet there was scarcely a blade of grass to be seen. Stock of all kinds suffered much in consequence. English corn markets remained inactive throughout the month. Any slight rise that took place in the price of wheat was occasioned entirely by the weather. The London averages at the end of the month were, wheat, 52s.; barley, 40s. A brisk trade was done in the cattle markets during the month, anything good being quickly disposed of. Serious outbreaks of the foot-and-mouth disease and pleuro-pneumonia were reported from Dorset, Lancashire, and York.

With the advent of September, the bulk of the harvest throughout the country had been gathered in in splendid condition, the cereal crops being in many cases quite above anticipation. The long wished for change in the weather took place during this month. Rain fell throughout the country, doing an immense amount of good to potatoes, turnips, and pasture lands. The corn markets throughout the month continued dull and inactive, with increased supplies and receding prices. The cattle trade, on the contrary, was brisk at times, with increased rates; and during the whole of the month nothing under an average trade was reported. Beef at the close of the month fetched 3s. 8d. to 5s. 2d.; mutton,

. to 5s. 4d., per 8 lb. The cattle
: continued to spread in England and
ıd with great rapidity.
:h rough weather was experienced
hout the month of October, occasion-
ıs of time and money to the farmer in
to the potato crop. Turnips bene-
nuch by the timely rains. The corn
ts throughout the month were active.
ıctions were numerous and heavy, and
of from 1s. to 2s. in the prices in-
ł the confidence of holders. A slow
vas done in the cattle markets, at ave-
ıtes.

nature of the weather throughout
ıber varied much. Much rain fell
the commencement of the month,
:owards the middle and end, frost was
a severe extent. Turnip lifting and
ing, however, were well advanced.
orn trade was generally dull and in-

About the middle of the month,
:ning news from Russia gave rise to a
ıtary animation, but that was short-
ınd the market again soon subsided
uiet. The cattle trade was very vari-
ometimes dull, and sometimes anima-
Average prices ruling.
ng December, a season of extremely
weather occurred. Frost and snow
prevailed to a great extent during the whole month, of course causing farming operations to be entirely suspended. At the beginning of the month, the corn trade was active, and the transactions heavy, but towards the close trade remained dull. Cattle markets were active during the month—there being a great many Christmas exhibitions of unusual excellence, with, in many cases, better prices than had been experienced for some years.

The war on the Continent has not had such prejudicial effects on our import trade as might have been expected from the length of time the struggle has lasted, and the weather. Many of the Central European States, of necessity, shew a large diminution, as, for instance, from Prussia itself we have only received about half the supply of grain in the eleven months ending November 1870, we imported in the same period of 1869. From Schleswig-Holstein, Lauenburg, Mecklenburg, and others, the decrease has been large, but not surprisingly so. We actually received from France during November, 3500 cwts. of wheat more than in the corresponding period of 1869. Our total supplies of wheat for the eleven months of 1870, were less by upwards of 4,000,000 cwts. than in last year.

AGRICULTURAL STATISTICS IN PRUSSIA.

TURNS have been published lately of the result of the harvest in the various :es of the Prussian monarchy; and al- these are at all times valuable, they present more than usually so. An t from them is now given; but, that be understood, it may be necessary should be explained that what is :d an "average crop" is indicated by :ger 1.00; and the decimals, therefore, ıe extent to which the produce is esti- to exceed or fall short of that average arious provinces of the kingdom. The are as follows:—

Province.	Wheat.	Rye.	Barley.	Oats.	Peas.	Potatoes.
Prussia.....	0.97	0.90	0.90	0.91	0.92	0.89
Brandenburg...	0.67	0.87	0.97	0.97	0.86	0.95
Pomerania.....	0.89	0.77	c.96	0.98	0.89	0.83
Posen.....	0.85	0.86	0.93	0.96	0.78	0.85
Silesia.....	1.00	0.97	0.89	0.88	0.67	0.95
Saxon.....	0.71	0.86	0.93	0.88	0.77	0.98
Westphalia	0.81	0.90	0.93	0.90	0.73	0.67
Rhenish	0.66	0.71	0.61	0.58	0.46	0.70
Hohenzollern ..	0.92	0.93	0.94	0.77	0.58	1.22
Hanover.....	0.84	0.92	1.00	0.95	0.83	0.84
Hesse-Nassau..	0.60	0.76	0.68	0.66	0.39	0.85
Schleswig Holstein.....	0.69	0.93	1.02	0.98	0.94	0.85
1870...Average	0.89	0.87	0.91	0 93	0.85	0.81

It will be observed that the lowest in the scale are the Rhenish provinces; and as these are the nearest to France, it is obvious that the difficulty of obtaining the necessary provisions for the army now in that country must be increased. In other respects, the instances in which an "average crop" of any kind has been reached are very rare. The above returns embrace the descriptions of crops in which interest may chiefly be felt in this country, but as in Prussia something more seems to be required, returns are also given as to other articles, as follow:—

Province.	Rape Seed.	Beetroot.	Lupins.
Prussia	0·82	0.84	0.77
Brandenburg	0.43	0.91	0.92
Pomerania	0.44	0.93	0.87
Posen	0.50	1.10	0.94
Silesia	0.66	1.03	1.00
Saxon	0.72	1.10	0.90
Westphalia	0.46	0.93	0.95
Rhenish	0.50	0.86	0.71
Hohenzollern	0.97	0.90	...
Hanover	0.68	0.96	0.86
Hesse-Nassau	0.35	0.91	0.65
Schleswig-Holstein	0.80	0.95	0.94
1870...Average	0.61	0.95	0.86

Of these, beetroot has been the most productive, and considering the extent to which that crop is made use of in the manufacture of sugar, this is a great advantage. The last return we give is that of straw, which is as follows:—

Province.	Wheat.	Rye.	Barley.	Oats.	Peas.	Buck-wheat.
Prussia,	0.95	0.95	0.88	0.89	0.90	0.9
Brandenburg,	0.65	0.81	0.97	0.95	0.92	0.93
Pomerania,	0.58	0.75	0.98	1.01	0.93	0.84
Posen,	0.82	0.87	0.91	0.97	0.82	0.94
Silesia,	0.92	0.94	0.87	0.83	0.71	1.03
Saxon,	0.66	0.78	0.89	0.85	0.77	0.93
Westphalia,	0.78	0.87	0.89	0.87	0.76	0.85
Rhenish,	0.59	0.67	0.58	0.58	0.51	0.88
Hohenzollern,	0.79	0.90	0.86	0.72	0.62	...
Hanover,	0.79	0.85	0.96	0.92	0.86	1.01
Hesse-Nassau,	0.53	0.70	0.64	0.57	0.43	1.00
Schles.-Hols'n,	0.65	0.85	1.00	0.95	0.93	1.00
1870...Average,	0.73	0.83	0.87	0.84	0.76	0.94

These returns are especially valuable in time of war, when forage is so much required, as information is thus afforded to the military authorities as to the districts from whence the most abundant supplies can be most readily obtained for the use of the army in the field. It may be further mentioned, as worthy of remark, that these Prussian returns are on a different principle from those issued by the Board of Trade in this country, which only make known the extent of land under tillage or pasture, and the description of crops under cultivation during the spring and summer, though all that relates to the actual "yield of the soil" is altogether overlooked, while that is what the Prussian returns more particularly afford, and is that which is of the greatest importance, not only to the farmer, but also to the statesman and merchant.

AGRICULTURAL IMPORTS AND EXPORTS.

THE Trade and Navigation Accounts for the month and eleven months ending November, lately issued by the Board of Trade, contain interesting particulars concerning our trade in agricultural commodities with foreigners.

Starting our summary with animals, we find that in November this year, probably on account of the high prices ruling and open weather, we received upwards of a-third more cattle than in the corresponding month of 1869—viz., 19,026, as against 12,066. On the eleven months, however, there was a marked decrease, the numbers being only 159,457, to compare with 182,482 in the same period of 1869. In the eleven months we had an increase of upwards of 2000 head in calves, the numbers being 30,165 and 27,978 respectively. There was a very large increase

imports of sheep during the month, ls of 14,000 head, but in the eleven s the supply was diminished by about ', the exact numbers received in that being, in 1869, 659,619; in 1870, '2. Lambs were in much the same —viz., this year, 18,711; last year, ;. There was a larger market for pigs, reaching us instead of 61,841. The value of the stock purchased from l, up to the end of October this year, ;3,480,290; last year, at the same date, hed £4,394,981.

ning to wheat, the table of imports nes food for curious speculation as well the body. For instance, we actually re- from France, during November, 3500 of wheat more than in the correspond- riod of last year when no devastating ged. Our total supplies of wheat for leven months were less by upwards oo,ooo cwts. than in last year; and the e expended on this commodity, up to d of October, was about one million -third sterling less than up to the same n 1869, viz., £13,460,978, to compare £14,804,274. The following table the exact quantities, and the countries whence they were derived:—

Wheat.	Eleven Months ended Nov. 1869. cwts.	Eleven Months ended Nov. 1870. cwts.
ia	7,761,915	9,446,686
nark	465,164	326,537
sia	4,264,520	2,534,573
eswig-Holstein, d Lauenburg	57,454	24,176
clenburg	578,312	457,205
se Towns	667,994	283,960
ce	444,458	212,603
ia, Croatia, and almatia	1,023,371	46,272
ey, Wallachia, d Moldavia	2,320,385	382,298
t	902,953	104,950
ed States	11,086,982	11,407,695
	509,002	580,967
sh North America	2,077,850	2,396,644
r Countries	487,691	276,870
Total	32,648,051	28,481,436

ive a scantier supply of barley, a very much larger supply of oats and peas, and slightly diminished returns of beans and maize, as will be seen from the subjoined figures:—

	Eleven months ended Nov. 1869. Cwts.	Eleven months ended Nov. 1870. Cwts.
Barley	7,068,985	6,603,092
Oats	6,350,792	9,818,225
Peas	797,299	1,699,496
Beans	1,663,464	1,371,028
Indian corn	16,044,138	15,821,117

On wheat, meal, and flour, there was a decrease of nearly 300,000 cwts., the total quantity received being 4,381,004 cwts. The total sum paid for bread stuffs of all kinds, wheat included, was very nearly the same as last year, £28,397,914, as against £28,411,985.

With regard to articles coming under the general head provisions, we notice little difference in the imports of butter and cheese; and eggs, notwithstanding the war on the Continent, reached us in nearly as large supplies as when peace reigned across the Channel, the number received being 411,033,480, as against 412,452,360 in the like period of 1869. With the exception of pork, which we received in larger quantities, there was a decrease in all other kinds of meat, fresh and salted. The abundant crop of potatoes at home, and their consequent cheapness, caused the imports of this esculent from abroad to decline from 1,476,209 cwts. to 769,079.

We had a larger supply of oilseed cakes, also of cotton and rape, the respective quantities of each being, up to the end of November, 1870, 137,647 tons; 107,333 tons; and 375,921 qrs., as against 131,354 tons; 94,794 tons; and 145,917 qrs., in 1869. There was a great falling off in clover seed, the quantity received being only 129,684 cwts., to compare with 191,123 cwts. in 1869.

There is a very large increase in the imports of Peruvian guano, so that the fears of that Government, that the war might ruin the trade, have fortunately, for them and us, not been realized. We imported about 1200

tons more of bones this year than last. Tallow was in greater demand, and tar in less. Of wool we imported 245,952,656 lb., as against 236,972,793 lb., the increase being entirely due to Australia.

Turning now to the exports of home. grown produce, we exported bacon and hams to the value of £122,713; beef and pork to he extent of £98,796, the values, in 1869, being only £91,317 and £18,084, respectively. Butter and cheese also were in more demand, the sum realized for the former being £281,813, and for the latter, £100,484, the corresponding values last year being £257,260 and £97,753. The export of horses this year is more than double of last, the numbers being 5601, to compare with 2110; the respective receipts, £213,852 and £127,631. We note, again, a great decrease in the exports of wool, the quantity taken by foreigners being only 525,699 lb., as against 882,701 lb.

VALUE OF METEOROLOGICAL TABLES.

WE have great pleasure in quoting from the *Farmer's Home Journal*, the following article, as we agree with our contemporary that the Science and the Practical Value of Meteorology is not yet sufficiently understood by agriculturists :—

But few persons entertain a proper appreciation of the value of the annual reports of the Agricultural Department, in the amount and diversified character of the information they furnished, the accuracy of their statistics of crops, and their estimates of probable future demand and supply, and the correctness of their meteorological report. In England, for some years past, the Government has taken great pains to secure reliable reports of this kind from every portion of Great Britain, and so complete and systematic are they that anticipations based thereon enable agriculturists to take timely precautions against the recurrence of droughts, storms, and seasons of famine. Our Department has bestowed much attention on this subject, and reports, carefully compiled from nearly three hundred observers, furnish data for anticipations that are at times realized with suprising accuracy.

Thus, to establish the important fact that there is direct connexion of periodicity with the field of agriculture, we extract the following paragraph, to which our attention has been called, from the tables furnished from Montgomery County, Maryland, and contained in the annual report of the Department for 1865 :—

> Four remarkable droughts have occurred within the past century; the first in the summer of 1806, the second in the summer of 1822, the third in the summer of 1838, and the fourth in 1854; an exact period of sixteen years' interval. Whether the same phenomenon will occur in 1870 remains to be seen.

That the prediction was verified during the past summer, is well known. What valuable information this would have been to farmers and the nation, and what an immense saving of time, labour, and crops would result, if these statistics were studied and their predictions regarded. With increasing attention upon the part of our people to meteorological principles and facts, will come benefits of which but few have now any just appreciation, and if the Department rendered no other service than the careful compilation of reports from all the states and territories, referring to climatic peculiarities, temperature, rainfall, &c., its labours would be of incalculable value to the country, and would alone be an ample return for the appropriations in its behalf.

In this connexion, and strikingly coincident with the paragraph given above, is the following :—

> The Paris (France) *Constitutional* last year (1864) gave a list of the famines and periods of scarcity in

during the last three centuries, from which ars that, in general, one year of want has d for every six years of plenty. In England, the cultivation is more thorough, the periods ity are less frequent. In Poland, the Ukraine, nubian provinces, where farming is the rudest, cur more often. *It is plainly owing to some Nature, yet undiscovered, that these unfruitful take place at comparatively regular periods.*

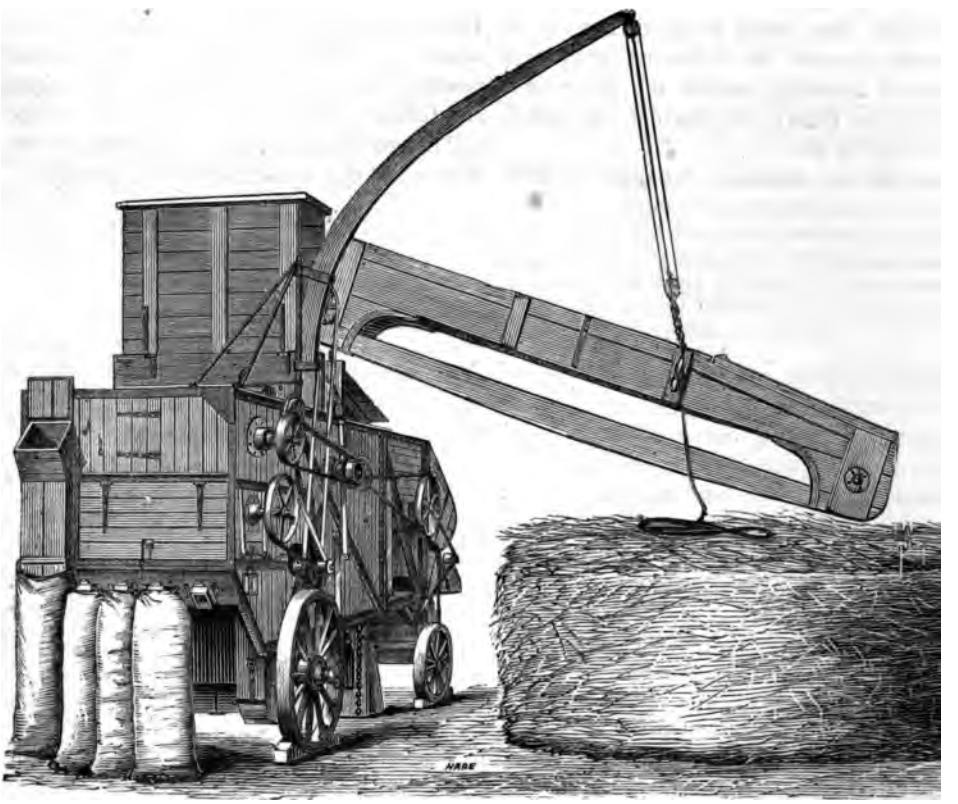
s said they are the means of recupera- ıe soil. It is well remembered that the ı of 1854 was one of great drought. leading agriculturists then predicted he parched condition of the ground bring to the surface the salts which led the lower soil, and of which suc- e crops had exhausted the top; on elief, they based the prediction of an ous harvest the following year, and sult certainly verified the prediction, er the theory on which it was based rrect or not.

s far our remarks, designed to shew the value of meteorological tables, have had reference only to those furnished by the Agricultural Department, but now we desire to impress upon the minds of our readers that they can, to an important extent, be their own observers, and their records, even though they embrace only the common-place events of the farm, the results of each season, the weather, degrees of temperature, and similar facts, will furnish them with information of great value. The errors of the past year will be pointed out, the results of experiments will be detailed, and precedents accumulated, upon which to base opinions and direct future operations. But these facts will have tenfold value if sent yearly to the Department, where they will be properly arranged. When classified, they become powerful agencies in the hands of writers and thinkers, with which to overthrow false and dangerous theories, or enforce arguments directed to the intelligence of the country.

Agricultural Engineering.

MESSRS ROBEY & CO.'S PATENT FEEDING APPARATUS.

THIS invention, which we figure below is a very admirable one. Its purposes are sufficiently indicated by the illustration. Its advantages are, that it does away with one man in feeding the threshing machine, thus doing away with a great deal of expense; it conserves human life and limb, inasmuch as it effectually prevents the possibility of any accidents in the feeding, where so many occur, to the permanent maiming, if not the actual death, of many engaged in foddering the machine. It s the corn, the drum being covered wit hood, which effectually prevents the from escaping, and it regulates the f preventing any unequal strain upon machine. The Implement Judges at Sleaford Show of the Lincolnshire A cultural Society say, that "The Self-F ing Apparatus exhibited by Messrs Ro & Co., of Lincoln, will entirely prev accidents with the drum, and for this al

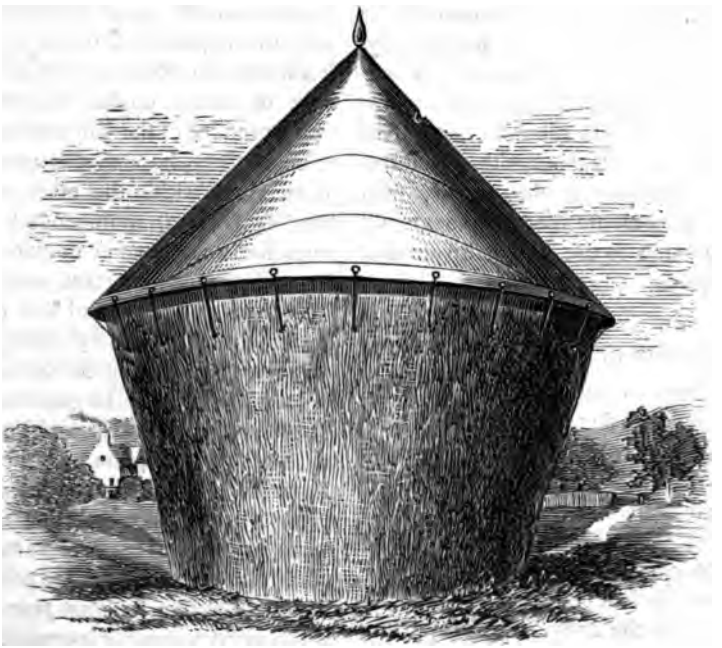


Robey and Co.'s Patent Feeding Apparatus.

it would be well worth the cost of alteration of, or rather addition to, every machine now in work, it could easily be added, and the cost would be small. By using the self-feeder, it is impossible to choke the drum, and so, by the regularity of feeding, power is economized, as well as the labour of at least one man saved."

GARRARD'S IMPROVED RICK CLOTHS.

WE can recommend these rick-cloths manufactured by Messrs Teighe & Smith. In fact we consider them most essential in wet weather. It is rarely that harvest is secured without a considerable amount of rain. These rick cloths could be thrown



Garrard's Improved Rick Cloths.

about the farm. Even if farmers do not purchase one for every rick, they should decidedly have two or three about the premises to use over in a few minutes, and effectually prevent injury from the wet. The woodcut shews the rick cloth properly adjusted on the stack.

The Farm.

THE CULTIVATION OF FLAX.

By Mr R. DAMEN.*

MR DAMEN, in giving a history of the rise and growth of flax, noted that for three thousand years all nations had used the article. In these early days, too, it was a fact that it could be manufactured to greater perfection, perhaps, than in the present day, with all our modern improvements in machinery. Prior to the introduction of civilization in England, people clothed themselves in the skins of animals; but with the introduction of Christianity, the people, with manners in a comparative degree greatly refined, soon came to use and cultivate flax very extensively.

IMPORTS TO, AND NECESSITY OF, FLAX CULTIVATION IN ENGLAND.

He was about to speak to them on the necessity of growing flax, which was so much required in this country. The quantity yearly imported at Bridport Harbour alone—and it was chiefly Russian—was about 1400 tons, the value of the same being about £80,000. A considerable quantity was also received from Bristol and other places by railway. Besides the above, it was estimated the quantity grown in Dorsetshire, Somerset, and Devon—nearly the whole of which was consumed in the neighbourhood of Bridport—to be annually from 400 to 500 tons, which they would observe was only about one-third of the quantity imported at Bridport Harbour alone. Indeed, he (Mr Damen) believed that last month there were foreign vessels in the harbour discharging flax of the value of £50,000. In England, in 1868, the quantity of flax grown covered 15,828 acres; in Wales, 169 acres; in Scotland, 1546 acres; in Ireland, 206,446 acres—total, 223,989 acres, being about 50,000 tons. It would be observed that the acreage in Ireland was more than ten times that in England. Notwithstanding this extensive produce, however, the importation in 1868—and it was a fact well worth attention—amounted to 90,833 tons, or nearly double the amount of the whole produce of the United Kingdom. The value of these imports was nearly a million, or to speak within the mark, of £750,000. He (Mr Damen) apprehended that however much flax was grown in England, there would always be found a market, and a ready market, for it. The demand was extraordinary. It was an extraordinary thing, he thought, that considering the great demand, there was under cultivation in England a less quantity than 20,000 acres. He could not help thinking that its cultivation must be more or less profitable. If farmers would only take the necessary trouble in getting their land in good order, they might cultivate flax which would realize a remunerative price. It must be remembered that the past year had been one of the worst seasons experienced for a long time. As regarded the profit arising from the cultivation of flax, it was a well known fact that in Ireland and Belgium, men rise from a state of indigence to that of affluence by growing it; he had known, some years ago, many men in the western part of this county grow flax, and thus rise to affluence. He could not believe that the bugbear "trouble," had restricted its growth. The men of Dorset were ready, as a rule, to embrace all improved systems of farming, and he could not understand why flax should not be grown because of the "trouble" involved. Indeed,

* Paper read before the Dorchester Farmers' Club.

ıing required trouble to be taken; all ements took time and trouble. He not think that the reason why flax ot been more extensively cultivated e trouble involved; he was rather dis- to think it was because their attention ıt been sufficiently drawn to it. For iderable period the growth of flax was, leases granted to farmers, prohibited. was sure that time had gone by; they not now find any intelligent landlord to the growing of flax, which did not, r Damen) knew, deteriorate the land. his own little experience in growing had been the most profitable part of g he had ever practised, although it the rudest possible way. He grew lax and good turnips, and wheat sown ne year turned out a good crop. The y of scutching the flax was an expen- ıy, but much improvement had been d lately. He was not sure that under w system the quality was much better; ey were certain to have it more regular that system than under the old one.

E AND SOIL IN ENGLAND SUITABLE TO FLAX GROWING.

ıate, he well knew, was an important mat- he cultivation of flax, but he felt that the e of Dorset was as well adapted as that other part of England. The climate nerally moist, and the Dorset farmer ıt suffer from the extensive drought ɔrevailed further eastward. He was sure was better here than in Ireland, where d could not be so successfully saved, the whole used being imported Riga and Belgium. Contrasted with England the climate was adapted for ing of both seed and flax. It really did o him that it would be a grand thing money sent out of this country could ed in any way. Could not, for in- a portion of the money sent out of rt—£80,000 to £100,000 a-year— ed? Surely such a saving would be a l benefit. And not only that; but ɔuld tell what would be the effect of Therefore it was not well to depend so much upon Russia, or any other country, for our supplies. We depended upon Russia for flax as we depended upon America for cotton; and when the supply of the latter was stopped in consequence of the internecine struggle which took place, we had to send thousands of pounds to the north for the relief of the cotton spinners. Cotton could not be grown in this country; but we could grow any quantity of flax. If a war should unfortunately break out between England and Russia, what an advantage it would be to grow flax more extensively at home! With regard to the £80,000 or £100,000 sent annually out of the country for flax, how much of that money could be spent in labour? He believed about one-third. There was the great fact that the population of the country was rapidly increasing. Here, then, were the means of providing for the surplus labour—let more flax be cultivated. He would not, however, recommend extensive flax growing where there was a scarcity of labour, where the number of cottages was small, where there was much trouble in getting men, especially at harvest time, because the flax crop came just before harvest. Therefore he would only recommend the sowing, as a rule, of a limited quantity of land. It was said, and said, as he believed, with truth, that flax should not be grown on the same land more than once in eight or ten years—not that it deteriorated the land for other crops, but that some change took place in the soil, rendering it unadapted for the same crop for several years. He was of opinion that one-tenth of a farm might, in some cases, be appropriated to the cultivation of flax—thus, on a farm of 200 acres there could be 20 acres of flax. Mr Smith, of Stafford, had, he believed, 20 acres.

MODE OF CULTIVATION: PROFIT A RESULT OF CATCH CROPS.

Mr Damen, drawing his address to a close, expressed his wish that they should thoroughly understand he did not recommend the substitution of a crop of flax for one of corn—that he considered would be the greatest possible mistake, for they would require their

corn and roots as at present. But he recommended flax as a catch crop. He wanted them to try to meet the increased expenses of their farms. He felt sure there was room for both corn and flax. Respecting the mode of growing flax, he said, in the first place, let them not sow it after turnips—it was a well admitted principle, that it did not thrive when thus sown, neither should they sow it on foul land, nor yet on exhausted land. In well prepared soil, flax might be grown with the greatest possible advantage after wheat. Let the land be ploughed in the autumn, and stay till the spring, when it might be ploughed again if desirable; let the seed be sown at the beginning of March if possible, so that it would come up as much before corn harvest as possible. He was quiet sure that they might grow good turnips after it. If they could find a crop of flax to pay them £10 or £12 per acre as an intervening crop, it was, he felt sure, worth having. (Hear, hear.) The quantity of seeds required was from 2 to 2½ bushels per acre. Two bushels were the lowest quantity; about 9 pecks were the medium quantity that should be sown. There would, with an average crop on good and useful land in that neighbourhood, be a yield of about 2½ packs, or 50 dozen to the acre, and 12 bushels of seed.

INFLUENCE OF POTATO SEED.

A CORRESPONDENT inquires, "What is your (*Albany Country Gentleman's*) opinion on the influence of cut and uncut potatoes for seed, and on small and large ones? There are many contradictory statements in the papers."

The contradictory statements are owing to the varying circumstances under which the experiments are made, without a sufficient repetition of them. Conclusions are drawn from too few tests. A single experiment will not do for the basis of a theory.

If the soil is sufficiently moist when potatoes are planted, cutting is an advantage. It reduces the number of stalks, gives fewer new potatoes, and, as a necessary consequence, allows those few to grow larger, and develop themselves better than where they are numerous in the hill, resulting from many stalks from all the eyes of a whole potato. But even here there is a considerable difference with different varieties, some potatoes growing thicker and more numerous in the hill than others.

If the soil and season happen to be quite dry, the cut pieces dry up rapidly, lessen the supply of food to the young and growing sprouts, and the plants are enfeebled. In such cases, the crop will often succeed better by planting whole potatoes, the skin of which being nearly impervious to moisture, keeps them plump for a long time. If potatoes are planted early in the spring, when the soil is nearly always quite moist, and remains so for some weeks, there can be no objection to cutting potatoes into pieces before planting, and the crop will be likely to be better and the tubers more uniformly large.

There is much diversity of opinion relative to the value of small potatoes. They are not usually so successful as large ones. But the wrong reason is assigned. It is said that "like tends to produce like," and that therefore small potatoes tends to produce small ones. This would be true if *true seed* from flowers, instead of portions of the root or stem, were employed. We might as well say that grafts cut from a large tree would produce larger fruit trees that others, or that planting large trees from the nursery rows would give orchard trees of greater size. The truth is, the tubers of potatoes are essentially underground stems, and the eyes are the buds. We could no more expect to

r trees by using large buds, than otatoes by planting larger tubers. less, we find by experiment that atoes give the heaviest crops. What ason? Simply this, that the large ve a greater supply of nutriment to g sprouts, just in the same way that ist soil they will do better than in ground. In repeated trials with not over 1 inch long, cut into as ieces as those 4 inches long, no ole difference was observed in the he tubers produced from both; but fully weighing, the large seed was yield about one-eighth more on an This difference was undoubtedly the earlier and more vigorous start large seed, and to the continued of nourishment, and not from any inherent change, as of "like producing like." The planting of the potatoes in these experiments was done in fine mellow moist soil, and early in the season; had it been late, or in a dry or parched soil, it is probable that the small potatoes would have yielded almost nothing.

It is well known that some varieties deteriorate in successive years in particular soils, so that the magnitude of the crop is gradually diminished. It would be interesting to determine, by a long series of trials, whether the constitutional weakness is affected by selecting the largest seed only, on the one hand, and small seed from poor crops, on the other. Numerous experiments during several years would be required to determine such questions, under differing circumstances, side by side.

SUGAR BEET.

EW and profitable source of cultivaion is being opened up to British by the enterprize of a French firm. actories and distilleries have been nd have failed. Their failure, it vas due to the fact that the roots were not of the proper kind, and machinery for distillation was far erfect. It was attempted to make nd spirits out of ordinary mangolds, saccharine matter in these was not it to yield a profitable return in sugar, stills in use were not equal to the thoroughly purifying the crude consequently, the latter could only be the baser purposes of commerce at rice. Now, by growing Silesian beet using the Savalle still, which has troduced into England by Mr James son of the celebrated French agricul- Mr Campbell, of Buscot Park, has orily proved that beetroot growing for ion, the refuse being used for cattle-feeding purposes, is as lucrative in England as it is on the Continent; and Mr Duncan, of Lavenham, has established that sugar can be made out of beet with profit.

There is nothing in the soil or climate of Great Britain and Ireland—as has been erroneously supposed—inimical to the growth of beet. It can be grown with as good results here as in France, Belgium, or Germany; and now that the war has made such havoc in the two principal countries mentioned, seems a good time for British agriculturists to commence experiments with beet. Perhaps we should regard beetroot cultivation for sugar making and distillation, as almost out of the category of experiments, after the success of Messrs Campbell and Duncan, and simply recommend farmers to follow these gentlemen's footsteps. The selection of seed is a very important element of success in beet-root growing, as indeed it is in all other kinds of cultivation. The Silesian beet, as we have indicated, is the best adaped for our

soil, and should there be any difficulty in procuring it in this country, which we scarcely think, Mr Barral will undertake to get a good assortment from the Continent.

The best sizes of roots for sugar extraction or distillation are from 1½ to 2 lb., although many much heavier give a good yield of saccharine matter.

The obtaining of good beetroot does not depend so much on the quality of the soil as on its tillage. The land must be well ploughed, very deeply; it must be well manured, and that not too near the sowing season. The beet sowing season is the end of April, or the beginning of May.

The importance of good deep ploughing is shewn by these facts: if the soil is not well tilled, the beetroots are too forky and more difficult to work in the distillery, and they are not so rich in sugar; the deep ploughing allows the beetroot to be well embedded in the soil, which is most important, for the part out of the soil is not so rich in sugar, consequently in spirit, as the part in the soil. Indeed, analyses of two beetroots, one from Berkshire and one from Surrey, made by Mr James Barral, prove that the lowest part is the richest in sugar, richer than the middle part or the top, as shewn by the figures and wood-cuts following:—

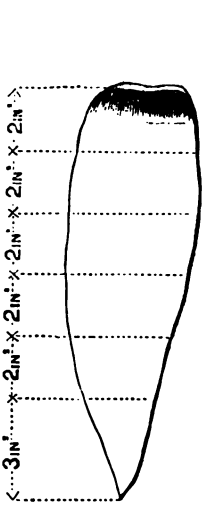
BEETROOT FROM BERKSHIRE.

Part			Water, per cent.	Sugar, per cent.
I.	weighing	7 ozs.	88.482	5.230
II.	,,	11 ,,	88.021	7.242
III.	,,	12 ,,	86.836	8.647
IV.	,,	10 ,,	85.255	10.500
V.	,,	6 ,,	85.086	10.734
VI.	,,	2 ,,	83.595	11.062

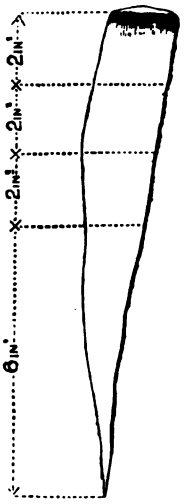
BEETROOT FROM SURREY.

Part			Water, per cent.	Sugar, per cent.
I.	weighing	2½ ozs.	87.39	6.02
II.	,,	3½ ,,	85.94	8.50
III.	,,	2 ,,	85.38	8.24
IV.	,,	1 ,,	83.85	9.57

With regard to the soil, it must be understood that beetroot sugar cannot be grown to advantage on very light lands. Indeed, the soil should not be less than 1½ foot in depth. It cannot be too deep, provided it be friable—a turnip loam being the best. The land should contain a fair proportion of lime, which is essential to the well-being of



Beetroot from Berkshire.



Beetroot from Surrey.

the plant. In all cases, the soil must be well worked. It will stand more working than for turnips. Indeed, it is impossible that the land can be too well prepared for beet.

Care is necessary in applying manure to the roots. On this subject Professor Voelcker says:—

If the soil is very poor, it is impossible to grow anything like a crop without manure; in that case farm-yard manure must be applied to the land in autumn, or 3 or 4 cwts. of guano, or a mixture of guano, bone-dust, and superphosphate and sulphate of potash. Peruvian guano has been used with advantage for beets on naturally poor soils, and when used in moderate quantities in autumn it greatly benefits this crop.

Sulphate of ammonia is also used on such land with considerable advantage for beets. Like guano, it should be applied to the land in autumn, and sparingly.

Ammoniacal salts, guano, rotten dung, and, in general, all nitrogenous manures, require to be used with discrimination, for their tendency is to encourage the luxuriant growth of tops, and to diminish the precentage of sugar in the roots. A certain amount of available nitrogen in the soil appears to be necessary for the healthy growth of the sugar-beet, and hence the use of guano, or sulphate of ammonia, or animal manures, cannot properly be condemned unconditionally, for, as just stated, these manures are benefi-

eets when the soil on which they are intended rown is either naturally very poor, or out of n by repeated cropping. On the other hand, ous manures, such as guano, sulphate of a, or rotten dung, should not be applied to ıen the land is in good heart. Soils in a good ıral condition always contain a sufficient of available nitrogen to meet the requirements root crop, and an extra supply of nitrogenous matter, or ready-formed ammonia on such es harm, inasmuch as it both diminishes the age of sugar in the beets, and prevents the turer obtaining, in a crystallized form, as n amount of sugar as he can produce from ontaining the same per-centage of sugar, but vithout the use of nitrogeneous manure.

non salt, so largely applied to mangolds in ntry, and nitrate of soda, retard the ripening and, in consequence, act injuriously on sugar-

On the other hand, phosphatic manures arly maturity.

rphosphate of lime may, therefore, be applied and with excellent effect at the time when the drilled in. Bone dust also does no harm, but beets. On light soils, in which potash is y deficient, a mixture of superphosphate and of potash has been found most serviceable to ı many cases, and can be thoroughly recom-, not only for light sandy soils, but upon all a comparatively poor agricultural condition.

ıut 15 lb. of seed per acre is the quan-sow in drills of about 18 inches apart. re is little difference in the after cul-f sugar-beet from that employed for ılds and turnips. Careful thinning and ıg, the keeping of the soil in a loose so that the roots may have plenty and the facility of easily thrusting vards, are all that are required. Frost prejudicial to beet plants, and if they acked after just having been sown in the best thing the farmer can do is to ı them down and re-sow.

ıut five months, in ordinary seasons, fficient to bring the beet to maturity, s a rule, it ought to be lifted about the ıf the equinoctial gales. The roots be left a little longer in cold wet er, for—being covered up to the top earth, as they should be—they then make a little more meat and sugar. ft in the ground in mild wet weather, ave a tendency to produce leaves from the proper amount of sweetness cannot racted.

The storing of the roots is one of the most important matters that the farmer has to attend to. All his early labour may be made nugatory unless the bulbs are carefully harvested. The slightest injury to the roots—a scratch or an accidental slice off the end—occasions a loss of saccharine matter. Upon this particular point Dr Voelcker says :—

> The crop should be taken up in fine dry weather, and special precautions should be taken to guard the roots, when stored, against rain and frost. It is desirable that they should be exposed on the ground for three or four days before they are stacked, in order that they may lose as much of their moisture as possible. The roots, however, should not be exposed for more than a few days to the air, and never to the sun. It is well, therefore, to cover temporarily the roots with their tops, in the field, before stacking. Some farmers are in the habit of stacking the roots with the tops, but this is not a good plan, and it is far better to cut off the tops carefully without injuring the roots, and then to stack them. In storing beets, especial care should be taken to prevent germination and throwing out fresh tops. As light, heat, and moisture greatly favour germination, which is always attended with loss of sugar, the roots should be especially guarded against these injurious influences. The most effectual plan to preserve roots in good condition is to select a dry and suitable locality, to pile the roots in pyramidal stacks, about 6 feet broad at their base, and 7 feet high, and to cover the stacks immediately with dry earth. At first the roots should be covered but slightly with earth, in order that the moisture may readily evaporate, and subsequently, when frost sets in, another layer of earth, not exceeding 1 foot in thickness, may be placed on the stacks. If at once a thick layer of earth is placed upon the roots, the moisture which they throw off cannot freely escape, and, in consequence, they are apt to heat and to suffer changes which diminish the amount of crystallizable sugar they contain.

The profits arising from the distillation of beet are said to be greater than those obtained by its manufacture into sugar. And the fact is accounted for in this way. Sugar cannot be manufactured successfully out of bulbs that possess less than 8 or 9 per cent. of saccharine properties, while roots yielding only 5 or 6 per cent. can be advantageously employed in distillation.

The returns from distillation are very satisfactory. At least the distillers themselves make it appear so (and it is not likely that any business man would exaggerate his pro-

fits) in the balance-sheets quoted by Dr Voelcker.

A distillery costing £4000, with a capital of £2000 to work it, makes 33 per cent.; one costing £7000, with a capital of £3000 to go on with, realizes a clear profit of 40 per cent.; and another erected at an expenditure of £10,000, with a working capital of £4000, 64 per cent. What sensible farmer, whose land is at all suitable, will not go in for sugar-beet distillation, when assured of such profits, and when he has the additional assurance, on the same high scientific authority we have named, that the refuse pulp from the distilled beet, is one of the best feeding materials for cattle? We have had samples of spirits, brandy, and perfume, distilled from beetroot, sent by Mr Barral, andthey appear to be wonderfully good and pleasant. A good feature in connexion with the process of distillation is this, that farm labourers can look after it, at a time when they might otherwise be idle; and put coin in their employer's purse as well as their own.

STRAW AS FODDER.

By Mr F. Everett, Shawdean.*

THERE are many uses to which straw may be applied. The chief use which the English farmer makes of it should be allowed, in every lease, to depend upon locality, and other surrounding circumstances. But the principal use that will have been made of straw this year, in many instances, provided it can be made palatable, will be that, I presume, of increasing the supply of food for our stock. But by appropriating a large quantity of straw as feeding material, we are at once met by a considerable difficulty, and one which I feel sure those who are present have already anticipated; I refer of course to the consequent reduction of the manure-heap. The best way to meet real difficulties is first to acknowledge them, and afterwards endeavour to apply a remedy. I am aware of the difficulty. For the present we have to do with straw considered exclusively as a source of food for stock. One essential of every feeding material is bulk; this, when stock will consume it, straw will undoubtedly supply; and that stock will consume straw during every season of the year, when properly prepared, I have myself abundantly proved. No amount of highly concentrated food that it will pay to give to an animal, can ever supply the bulk that all food for animals must necessarily contain. On this point let us consult the heads of departments on our farms; their opinions cannot, with impunity, be always cast aside. What is the point on which carter, fogger, and shepherd for ever dwell—is it not a "belly full?" Shepherds are for the most part satisfied when this very essential point is gained, and I believe, as regards his flock, nothing adds to the profound satisfaction of the shepherd so much as seeing his sheep, both old and young, so full that he can hear that peculiar grunt characteristic of entire satisfaction on the part of the sheep, as they recline under the weight of complete satiety. But bulk is not all that straw well-harvested, and not over-ripe, will supply.

REAL NUTRIMENT IN STRAW.

We enter now upon one of the most interesting problems which can be presented for the consideration of practical men. The point to decide is this—what amount of real nutriment does straw contain? To obtain an answer to this question I shall quote largely

* Paper read before the Newbury Farmers' Club.

Dr Voelcker's paper, published in the Agricultural Society's *Journal*. It may ll, however, to bear in mind at the out- at no experience which may have been lually gained regarding the feeding of straw, will be of much worth as com- with the experience of another, unless nditions under which both may have l their experience are precisely similar, r this reason: straw in different states turity presents, on analysis, very differ- sults; and I think I may also venture that those who have fed with over-ripe and those who may have chanced to eir corn before it has become over-ripe, ven the straw to their stock, have like- bserved very different results. I have right to make this remark, as I have h straw extensively under both condi-

As a feeding material, on the extent turity to which the straw is allowed to nearly everything depends. We glean Dr Voelcker's paper the following —

aw contains only from 14 to 17 per of moisture; there is in it about as solid matter as in meal and other of dry food, although it is considered vorth only from 20s. to 30s. per ton."

Dr. Voelcker wrote his paper, we of course, that straw has risen in value, wing to his paper and increased ex- e, it will continue to rise.) "The straw, however, includes a large pro- of woody fibre, which, if digestible at nly partially assimilated in the system. suming that not more than one-third weight of straw is digested by cattle, bably less by horses and sheep, and g that the assimilable part is not food most nutritious character, straw will ve to be regarded as a more econo- eeding material than any other which supplied." "It is undoubtedly a Dr Voelcker goes on to say, "that ractical feeders are in the possession secret of converting considerable ies of straw into beef. What this s, perhaps, not known even to them-

It may be that the combination in which straw is given, or the preparation to which it is submitted before it is placed in the feeding-troughs, has something to do with the success attending its use; but it is yet more probable that on farms where straw is largely and economically cut into chaff and given to cattle, its condition, from early harvesting and other influences, is better than in other localities where the practice prevails of allowing corn to become over-ripe before it is cut. In consequence of this mischievous practice, straw gets more woody and less digestible than it would have been had the corn crop been cut earlier.

KIND OF STRAW BEST FOR FEEDING.

In the conversion of the cellular fibre of straw cut when not over-ripe into the woody fibre of over-ripe straw, much of its value depends, as we shall presently see. Dr Voelcker has remarked that there is not so much difference in the value of the different kinds of straw, as between the same kind of straw in a condition somewhat unripe, and when arrived at full maturity. And he further points out the importance of ascertaining, if possible, whether woody fibre is in any degree digestible. "The older and harder the plant, the more woody or incrusting matter it contains." In green herbage, the insoluble residue obtained under analysis consists of celluton or cellular fibre; "whilst in fully matured and over-ripe herbs the insoluble residue principally consists of incrusting matter or true wood."

You will observe that cellular fibre and woody fibre, though found under different conditions of richness in straw, are both insoluble, and from a careful perusal of Dr Voelcker's paper, I come to the conclusion that for all purposes of chemical investigation they must be considered as one and the same substance; but at the same time, over-ripe straw fodder contains woody fibre, and is not relished by cattle. Straw cut comparatively green contains cellular fibre, and is particularly palatable to stock. But again the question recurs, is this fibre, woody or cellular, actually digested by the animal organism! On this point allow me to quote

Dr Voelcker's exact words:—"As long as we are unacquainted with more perfect analytical methods, we cannot expect to ascertain by analysis whether cellular and woody fibre is digestible, wholly or in part, and to what extent." Here, as in so many other matters which have scarcely been touched upon by scientific men, the agriculturist must be guided by his own experience, and not by the rash counsels and exaggerated statements of theorists, who are incompetent to form a sober and unbiassed opinion on a moot question. We know that the condition of the woody fibre affects the nutritive value of all food in no mean degree. Whilst in root crops left too long growing on the land, or the fibre of grass and clover left standing until dead ripe, these tissues are not readily digested, there can be doubt that the soft fibre of young grass, clover, and roots, is readily assimilated in the animal organism, and transformed into starch, sugar, and finally into fat. For this reason, grain crops, more especially oats, when harvested early, produced straw which is greatly more nutritious than that of an over-ripe crop. In some parts of Scotland it is customary to cut the oat when the top of the haulm is still quite green; and it is upon straw of that description that store cattle are kept during the winter almost entirely. The variable condition in which grain crops, as well as peas and beans, are harvested in England, fully explains the various shades of opinion which are entertained by practical men respecting the feeding properties of the straw of these crops, and the contradictory statements of writers on the subject. For this same reason, the practical solution of the question, whether woody fibre is digestible or not, is surrounded by peculiar difficulties. Taking experience for our guide, it may be answered with equal truth in the affirmative or in the negative; for in a young tender condition we know from experience that cellular and woody fibre is digestible, whilst in a hard, dry, over-ripe state it is for the most part indigestible. Direct feeding experiments, highly desirable though they may be, will leave much uncertainty, however carefully they have been made, unless special regard is paid to the condition in which the straw is given to the animals; and after all, as it is not possible to describe with absolute precision its state of maturity and condition, no practical feeding experiment, be it ever so carefully conducted, can afford absolute numerical results, indicative of the extent to which woody fibre is digestible in all instances.

AMOUNT OF OIL IN STRAW.

Let us turn to points upon which more certain information is presented to us—the amount of oil contained in straw, determined with precision, likewise that of albuminous or flesh-forming matter; also the amount of organic substances soluble in water, then as sugar, mucilage, gum, &c. That even wheat straw is good for food when mixed with other substances, I know from information given me by one of the most practical men I have had the pleasure to meet, and on the farm which he manages, I saw it being cut into chaff with green stuff as food for cattle. Dr Voelcker's opinion of barley straw is as follows:—"In my opinion, barley straw, not too ripe, is nearly equal to oat straw reaped in the same state of maturity, and superior to wheat. It is usually richer in albuminous compounds than wheat straw, although the larger portion of albuminous matter found in barley straw is in part due to some clover and grass which gets mixed up with the barley crops." Of the value of oat straw, as a food for all kinds of stock, I can speak with the greatest confidence. I have used it very extensively, and without it during the past summer must either have sold my horned stock, or bought food extensively, to a greater extent, probably, than would have paid. The oat straw I used was that of last year, and, as may be supposed, was dry and uninviting in appearance; it was, however, cut into chaff, over which gruel, made from the best oilcake I could get, was freely sprinkled, and was allowed to remain in a heap twelve hours before use; this is a point of chief importance. Somewhat to my surprise, during the hot weather of last

er, this mixture was greedily consumed th cattle and horses, and kept them in ordinary condition. In the case of the s, I only gave it to such as were out of

The same mixture was given to cows lk, with the addition of extra cake; these ise kept their condition, but could not of e be expected to keep up the usual y of milk, owing to the absence of grass. year, finding oat straw so valuable, even fully ripe, I determined to follow out oelcker's directions more exactly, and orst portion of my oat crop I cut green— s made into oat hay; this is now being to young cattle and cows as it is cut from k. The young cattle are doing well, and ilk from the cows immediately increased hness when this food was given them. heep the same oat hay is cut into chaff, the addition of a third part of meadow

The result with sheep I find to be that crowd to their troughs as eagerly as the best clover hay I can produce on rm is supplied. It will be remembered, ver, that even when oats are harvested s very green state, some corn will be when the rick is cut, much more, pro- , than would be expected.

OBJECTIONS TO STRAW FEEDING.

s now time that we should consider the objection to making a general practice ng straw as fodder. By doing so our y of farm-yard manure must be conside- reduced; and farm-yard manure is a we cannot afford entirely to part with. would suggest improving the quality, to up for the loss of quantity. I do not one-third less manure carted on to the lea in course, or wheat, provided it h and well made, instead of being, as often find it, poor and badly made, be followed by any decrease of yield in eat crop. More especially might we look ourable results from such a system on hter soils. I am perfectly aware that re mechanical effect of long dung, and traw alone, on some heavy soils, cannot spensed with, and the cultivators of oils will be the last, and rightly so, to adopt any other system than that which they have pursued with great advantage, namely, carting out a considerable quantity of manure in a raw state, or littering their fields with straw and penning with sheep, as I observe to be the common practice near Devizes. But the cultivators of such soils do not compose the majority of farmers. A certain decrease in the mere quantity of our farm-yard manure will not, therefore, be found, I think, generally speaking, a sacrifice too great to prevent an increase to the fodder supply by a greater addition of straw, provided the construction of farm buildings is such that this will allow of manufacturing home-made manure to the greatest advantage. Here is the real difficulty; badly-constructed buildings and too extensive open yards, no spouting round the building, no drains leading to a well-constructed tank, so that the liquid (the more valuable portion of animal excrement) may be pumped back and throughly absorbed by too solid manure. I forbear to pursue the question of buildings further. I should be departing too far from my subject. It is one, however, so interwoven with the consideration of the "use of straw," that it might perhaps be profitable if taken up on a future occasion. By touching upon it, I make no sly hit at owners of land; but at the same time it is a known fact, to those best able to judge, that farming cannot be profitably conducted without good buildings, and that there is great deficiency of good buildings throughout the country. Societies abound which construct them on the best known principles; they may be paid for by annual rent-charge, imposed upon the tenant, and in most cases the tenant will be found willing to pay.

I have not touched on the value of bean and pea haulm; both are very highly valued by some farmers, and we are all aware of the value of pea-straw; that of beans should be cut quite green, if we wish to use it as fodder. Dr Voelcker places the different kinds of straw in the following order, beginning with the most nutritious, and ending with the least valuable, for feeding purposes: pea-haulm, oat-straw, bean-straw with the pods, barley-straw, wheat-straw, bean-stalks without the pods.

BREEDING AND MANAGEMENT OF PIGS.

By Mr Stearn.*

MR STEARN dwelt on the importance of the pig, an importance now recognized by agricultural societies, and spoke of the astonishing fecundity of the sow, and the value of the flesh of the animals as an article of food. He said, formerly, large breeders and graziers thought the pig beneath their notice; but the thing was changing, for he supplied gentlemen in Australia, America, and almost all parts of the world. Still he was often both disgusted and surprised to see what a disgraceful lot of pigs was still kept by many large agriculturists as well as small ones, such, as if kept to any extent, would ruin any one, for they ate an enormous quantity of food, and would neither grow nor fatten upon it. He had studied the management of pigs for the last thirty years, and had found that the better the attention paid to them the greater the profit, and if a person wished to make a pig pay, it must be kept well when young, and not allowed to run twelve months in almost a starving condition.

He must first speak of the piggeries, and he must say he seldom saw one he considered fit to put a pig into. Some were badly ventilated, others low and damp, nine-tenths too small, some too confined, with no means of altering them between summer and winter, and many had the cisterns to receive the wash, &c., from the house inside them, which was very bad, the constant stench injuring the health of the animals, and was most unpleasant to those who had to attend to them. But the worst sties were those with wooden floors laid over a pit, which become full of unwholesome rubbish. He had said he was surprised at the pigs kept by many persons; but he did not know if he ought to wonder so very much, when he took into consideration the general construction of places in which they were kept. If there were one corner on the premises worse than another, there the pig-stye was placed, and people almost wanted marsh boots to get to it. There was no question that it would be a great boon to the tenant-farmers if landlords would take more interest in providing better buildings for the pigs. It was not the most expensive place that was the best, but what was required was a simple, economical, well-situated, and well-planned piggery. Some built expensive brick and stone buildings, which he had proved were not so healthy as a boarded building, tiled and slated; it should be reeded and plastered underneath, to prevent the heat of the sun penetrating in summer and the cold in winter, with a ventilation at the top made to open and shut. There should be half-doors. The farrowing pen ought to be large, to give the sow plenty of room, and to admit of rails being placed round the side, so fixed as to prevent the sow lying on the little ones. These rails should be made to shift according to the size of the sow, from 8 to 12 inches high, and extending about 9 inches from the wall, having the supports carried out sloping from the rail to the wall, instead of straight from the floor, so as to leave plenty of space for the pigs to pass between the sow and the wall. Since he had used these farrowing rails, he had had hundreds of pigs, and had lost scarcely any from being crushed, whilst taking an average of the country nearly half were lost from that cause. Each pen should be 8 ft. by 10 ft., and the best floor was asphalte or concrete. Boards could not be healthy, for if placed close the moisture stands, and the floor becomes sotweated, and if a space be left the refuse litter goes between, so that it will become a mass of putrid matter, likely to bring on all kinds of diseases. In cold weather, asphalte or concrete was too cold for very young pigs, and he had false lattice floors to

* Paper read before the Stowmarket Farmers' Club.

wn. These were taken up when re-
, and everything swept from under-
He had the beds attended to, and
littered every morning, for the cleaner
e was kept the better the pigs throve.
loors were washed down occasionally,
verything ran off, the asphalte or con-
oon drying. Another advantage of such
was that they did not take more than
irds of the straw required for any other
for the moisture seemed to run under
:er without wetting it so much, the floor
laid a little on the slope. The litter
he pens served for the pounds outside,
ought to be paved in some way to pre-
he pigs rooting. A tank should be
just outside to receive the drainage
he pounds, the building being troughed
e off the rain water. The manure was
nade regular and good. On the hot
such a piggery was cool and pleasant by
ıg the lower doors. Lattice slips were
all the lower doors to prevent the pigs
g out. Whilst pigs were perfectly cool
s model piggery, the herdsman had to
ınd several times in the day to all the
places with a watering pot to pour
over the pigs to keep them alive.
then spoke of breeding, saying that in
ng pigs for breeding, great attention
l be given to choosing a good breed
ould come to early maturity, for that
here the profit was gained, and the
the quality of the breed the less food
quired to bring them to that maturity.
nsidered no other breed so well adapted
ost localities as the black and white
ts. The improvement took place not
it was wanted, for a worse animal
not be found than the old Suffolk pig,
its long thin snout, large lap ears,
l back, long legs, thin body, coarse,
hair, thick, long, straight tail—in fact,
verything to make it a disgusting-look-
rute. When he read a paper on
e," a few years since, he said he did not
lack pigs so well as white, but by judi-
rossing they have become equal to the
and he now had scarcely a preference.
vere similar in form and symmetry, and
both come to early maturity, and fattened to a great weight with a small quantity of food in proportion to that weight.

In choosing the boar and sow of the Suffolk breed, the chief points were a rather small head, with wide heavy chaps, short snout, broad deep chest, ears rather small and thin, with the ends sharp and pendulous, pointing a little forward, roundness of rib, shortness of leg, and small feet, long body, the thigh well dropped close to the back, shoulders and hams thick, the neck rising well behind the ears, small bones in proportion to the flesh, broad or straight, or slightly rising back, tail small and curved, and placed high, hair thin, long, fine, and silky. As much or more attention ought to be given to the boar as the sow. He preferred sows for breeding to be rather larger than the boar, and good sized animals, they being more likely to have a large number of pigs. He considered ten or twelve pigs sufficient in the general way to bring up. A sow for breeding should have ten or twelve paps. He did not recommend breeding very young. The proper time for the sow to begin was from ten to twelve months old, the boar being from eight to twelve months. It was well to cross as far distant as possible occasionally, so as to strengthen the constitution. Some time back he purchased sows from two gentlemen, one of whom had bred in for more than thirty years, and the other for sixty. The first farrows they produced with him came out full of ulcers, the legs of most were crooked, with large spavins, and many turned out good for nothing. When wishing to make a cross, his plan was to buy a sow of a different blood, and then to fall back on his original stock, retaining, by this means, the same character without injuring the breed. The time of gestation averaged 113 days, but old sows were rather longer than young ones. A sow in pig should have full liberty to roam about, and feed on grass in the summer, whilst in winter she should have roots of various kinds, and about three-quarters of a pint of beans per day. At the time of farrowing, the proper plan was to have a man with the sow to attend to her, as it was

not wise to lose half, or perhaps the whole of the pigs for want of a little attention at the most critical time. He also gave only a very small quantity of litter cut short, and he had a hamper placed in the pen with a little straw in the bottom, and lined with an old blanket. A partition about 2½ feet high was put across the pen to prevent the sow getting at the hamper as the pigs came out. The pigs were placed in the hamper and kept there till the sow had done farrowing. After that they were put to the sow to suck, and then put back to the hamper. The sow had then a little warm milk and bran given her, and the bed was attended to whilst she ate this, and the pigs were allowed to go to her again after she had finished her meal.

He found that it was the cheapest and best plan to give the herdsman 6d. each for all pigs he could bring up to a month old. As to a sow eating her young, the cause was, that in some litters the side teeth were much longer and sharper than in others, so that when the pigs began to suck they bit, and scratched the paps, and caused irritation, which sent the sows mad with rage; she threw one one way, and one another, and if she drew blood would eat the pigs, and a sow that once did this was no further use for breeding. His plan to prevent this was to take away the pigs in the hamper, so that the sow could not hear them, and nip off the long teeth with a pair of pincers. When they were put back, the sow would be found to be kind to them, and perfectly docile. With his model piggery he preferred breeding in the winter, as the building could be easily kept to the proper heat, and after proper care for the first day or night, the cold did not appear to affect them so much as heat. Pigs which were farrowed in January or February would grow and thrive in the spring and summer, after being kept eight or nine weeks with the sow before being weaned. They were then fit for either breeding, feeding, bullock-yards, or anything for which they might be required in the autumn. By this means they could have another litter of pigs in August, instead of October, for when farrowed too late in autumn young pigs would not thrive through the severe weather in winter, and if they were turned as usual into cold yards or open piggeries, they would be worth very little more for their two or three months' keep.

Eight weeks in summer and nine in winter will be found a good time for weaning pigs, and he liked to have those which were not saved for breeding, operated upon a short time previously. Boars for stock he kept confined in a shed with a roomy yard, allowed them plenty of water, and fed them on any food which was most convenient, such as vetches or mangold wurtzel. As to feeding, when the pigs were about three days old, and whilst the sow was feeding, he gave them some new milk, warm from the cow, sweetened with a little sugar. In three or four days he mixed half-skimmed milk and some oatmeal or sharps, leaving out the new milk by degrees, as well as the sugar, replacing them by Indian corn or barley, whole. The sow should be fed on mild food for a few days, such as bran mixed with warm milk. After a few days, add barley or bean meal, and increase the quantity of these as the pigs grew. For a few weeks after the pigs are taken off the sow, they cannot be fed too well or too frequently, but care should be taken not to give them too much food at a time. He gave them a variety of meals, as was most convenient, wetted them with cold, and scalded with boiling water, and sprinkled it with a little salt. The food was mixed a day in advance, which gave time for slight fermentation. In summer, the food was mixed entirely with cold water, and given cold. Between meals he gave the pigs whole maize, mangold, and swedes, cut small, with a little coal or soil occasionally, and he allowed them plenty of clean water. For fatting, he gave wheat, barley, and maize meal mixed together into slops, water always kept by them, and a little mangold cut for them occasionally. Washing and brushing were very beneficial. The difference between this and the common method of treatment was most surprising. Store pigs should have their liberty as far as convenient, and have the range of large yards in the winter, and of a piece of pasture in

er. Well-bred pigs, properly fed, would consume the refuse of the farm and

As to the tails of young pigs falling e cause was a mystery he had not been o solve. He gave in detail his experi-, made with a view to test the generally-ed theories, and said, "I have quite made up my mind it is neither breeding, feeding, hot weather, cold weather, nor easterly wind, which is the cause, nor does it signify, whether the pigs are black or white; therefore I must leave it to some one with a wiser head than I have to solve this mysterious affair."

ACORNS.

E copy the following from the *Food Journal*, by Mr F. Wilkins:—Acorns e purposes of feeding have recently re- much attention throughout the press; we consider the various processes to they may be subjected, their value in nce to the food question will at once r, although their unpleasant flavour pre- their becoming an article of general

e most important purpose to which they be applied is the manufacture of starch. a is at present principally made from rice, or potatoes; but if it can be procured other materials, these will all be available nsumption, and must therefore be con-d as so much food saved or gained.

e quantity of starch used in the United lom alone, for laundry purposes, must be hing considerable. If we assume a ¼ lb. e minimum used for each one of our ,000 inhabitants annually, this will amount 00,000 lb., which, at 5d. per lb., is worth 250.

atoes contain about 10 per cent. of starch, t ten times that quantity, nearly 75,000,000 ust be used to produce it. This is so food practically wasted. If this starch is sufficiently refined to be employed as arrowroot, as well as for laundry purposes, it may then become a useful article of diet; and, owing to the abundance and cheapness of acorns, it would be made much more easily than from any other source. Ripe acorns may generally be bought for less than 1s. per bushel; and the process of starch manufacture would be similar to that from corn or potatoes, namely, by grating, steeping, washing, straining, and drying in the usual way: the gallic acid may be neutralized, or extracted for other purposes, such as the manufacture of ink, of which it constitutes the principal element. I would also suggest the practicability of converting acorns into sugar or gum, either for domestic use or for distilling purposes. By this means a great saving would be effected, and the residue might be given to pigs, which are notoriously fond of acorns, and thrive well on them. Pheasants, domestic poultry, rabbits, &c., eat acorns greedily, when crushed up or ground; though it may be desirable to mix them with other meal until they are accustomed to this diet, being a strong medicinal astringent; hence, farmers are in the habit of giving acorns to calves when they require treatment, and this in preference to medicines of other kinds.

Papers by Tim Bunker.

NO. LX.—TIM BUNKER ON REAL ESTATE IN THE WHITE OAKS AND HOOKERTOWN.

"THAT White Oaks property is not worth so much by £100 as it was eight years ago," said Uncle Jotham Sparrow-grass to Kier Frink, as he stopped his horse to blow on Hookertown street yesterday.

"That's so," said Kier, sticking his old boot into the nigh wheel of his coal cart, for a rest. "But what's a poor fellow to do, when property is all the while falling, and money's getting more scarce? Ye see, when I first went into the White Oaks to live, coaling was a good business, and a fellow had a chance to make something extra on swappin' horses and pitchin' quoits. But now everybody is so poor they can't pay the boot in a trade, or the stakes when they git beat in quoits. I'll tell you what it is, Uncle Jotham, there are not coppers enough in the White Oaks on ordinary occasions to buy a decent glass of liquor. I'm going to sell out soon, and come on to the street to live, and so keep from coming on to the town."

"There will be small chance for you here," said Seth Twiggs, pulling out a tinfoil package from his pocket, and thrusting in his pipe and forefinger at the top. "You see, your 80 acres wouldn't buy 5 here. Property has been rising here for the last ten years."

"Well, I suppose the old man won't hold on for ever," said Kier, looking up the hill, where Jake Frink still leads a slipshod life.

"It's poor business waiting for dead men's shoes," said Uncle Jotham. "Better run that coal cart oftener, and swap horses less. Pitchin' quoits, and taking the stakes in liquor, does not pay in the long run. Land is not worth much in the White Oaks or anywhere else, unless you work it. They work the land about here as well as everything else. Anything, or anybody, is beaten who is idle."

"Yes, yes," said Kier, "I remember them beatings. That's what started me off, where things went easy."

"And people round here take THE FARMER," chimed in Seth Twiggs, whose pipe by this time was in full blast. "More than forty copies come to the Hookertown Post-Office, and it is not more than twelve years since there were only three, and I was the fourth man that took it, and I shouldn't have done it if it hadn't been for the woman. You see, she offer'd to pay for it if I couldn't. She laughed consumedly when I sat up reading on it the first night it came, till twelve o'clock."

"A pretty state of things we'll have here in Hookertown shortly!" exclaimed George Washington Tucker, who had now joined the party. "What with your FARMERS, and old Bunker's experiments, and everybody aping him, and snapping up every bit of land that comes into market, there won't be any chance for a poor fellow to live in town. Rents have more than doubled in five years."

"Doubled!" exclaimed Benjamin Franklin Jones. "I've got to pay £100 for my place this year, and ten years ago I got it for £25. Some say it's short crops. But that's all nonsense. Tim Bunker and the paper is at the bottom of the whole of it. You see, when that salt marsh was reclaimed, and the bottom knocked out of that horse-pond at the foot of Jake Frink's hill, everybody took to drainin' as if their fortune was going to be made right off. There is not a swamp anywhere within 5 miles of Hookertown now, but what is as dry as a bone, and covered with the finest kinds of grass or corn. Such a hankering after land I never expected to see. Folks are no plentier than they used to

at land is a deal scarcer, and growing so. There's no kind of decent chance or folks to live."

is talk of my neighbours shews the drift blic opinion on the real estate question. me communities, farming lands have and quadrupled in value within the last y years. In others, they are worth not than they were a hundred years ago, ardly so much. Jones has got hold of hilosophy of it, though he is not much philosopher, where his own affairs are erned. In the White Oaks, and places at kind, land is cheap because cheap le own it, who think a good deal more ooting-matches, horse-races, and poor y, than they do of farming. It stands ason that the land isn't worth much s you work it, and get something out of If it bears nothing but wood, cut off for once in thirty years, everybody presumes is all it is good for. Nobody that has al wants horse jockeys, gamblers, and rs, for neighbours, and so land is cheap e White Oaks. Land is worth any sum an make it pay the interest on, and take of itself, and isn't worth a farthing more. is dear at 10s. an acre, and others at £5, for farming purposes. And it not depend altogether on its original acter. Poor land can be made productive ght treatment, and pay its way as well as which is good. The horse-pond lot was property for Jake Frink at 10s. an acre. lid not get his interest from it at that . It certainly is worth £5 to me, aside the abatement of a nuisance, which it s was, until it was drained. A variety auses have made land dearer about kertown. There are more people, and of e more purchasers of homes. Improved andry has had greatly to do with this; in this matter agricultural societies, rs, and books have had their influence. od farmer put down in any community, s the price of land all around him. If ts 6 qrs. of wheat to the acre, and makes rth say £18, his neighbours will not be content with £5. Big crops raise eputation of the land. They tell every year upon the purse of the owner, and when he wants to add to his acres, and comes into the market to buy adjoining land, he cannot buy at the old prices. He has been all the while working against himself as a purchaser, and raising the price of his neighbours' farms. Just beyond Shadtown there is a big plain, where any quantity of land could have been bought twenty years ago, for £15 to £20 an acre. It was difficult for farmers to get rid of it, even at these prices. It is now worth £100 an acre. A fish oil factory in the neighbourhood made cheap manures, and started a better style of farming. Here, in Hookertown, we have not only cheap fertilizers, but a constantly increasing class of farmers, who are all the while putting more *brains* into the soil, which starts crops faster than bony fish. The Farmers' Club is active, and Deacon Smith and Mr Spooner keep talking, and Seth Twiggs smokes out a good many errors in the course of the year. The draining and the manure, and the new tools and seeds, tell their own story, and, as Jones says, "everybody has a hankering after land." Farms, like clothing, have risen. THE FARMER subscription list has risen also, from one to forty in this locality, and real estate agents, if they were fair, would vote it a medal. Hoping they will do the clean thing,—I am, yours to command,

TIMOTHY BUNKER, Esq.

P. S.—Dear Mr Editor, I had almost forgotten to add that, having completed my three score letters to your columns, I must now pause. "Why," you will doubtless ask, "why, Timothy, don't you, being a conservative of all good customs, although an innovator on bad, make up the three score and ten—the number of years you know, Mr Spooner will tell you, is the allotted life of man?" The truth is, dear sir, I am exhausted just now, I have not been out of Hookertown for a while, and I want some new matter. Relaxation and a change of scene I mean to have during the festive season, and after that I shall endeavour to add the ten that you want to the number of contributions you have already kindly inserted.

The Garden.

TERRESTRIAL ORCHIDS.

THE close affinity of the tropical species of orchids with our native, and the adaptability of some suited to cold frame culture, may induce some of your readers to grow a few such as I describe with cultural notes herewith. These few are not so well-known as they deserve to be, or they would be more appreciated than they appear to be at the present time. I may here state that the described species of terrestrial orchids are very numerous, and are distributed pretty generally throughout most of the temperate countries of the world; few, however, in cooler countries than Britain, and never in very dry countries. Many are unknown to cultivation, existing only as dried specimens in large botanical collections, and of which it is not my province to speak here further than that some of the species are reported by travellers to be extensively used in some countries as an article of diet. A New Holland species of Gastrodia, with large tuberous roots, like a series of kidney potatoes, is eaten both by the aborigines of Australia and Tasmania. Other species possess certain degrees of medical qualities. The glutinous properties of one of the North American species is such as to have gained the common appellation of putty-root, and is used for cementing earthenware, &c.

The first that merits special attention, in a cultural point of view, is the large orange and scarlet Cape species (Disa grandiflora). Although there are several described species of Disa, this appears to be the only one worth the trouble and expense of importing into this country, although the horned orchis (Disa cornuta), the spoon-tipped orchis (Disa spathulata), and the long blue orchis (Disa graminifolia), would be very interesting species to cultivate. Would that some of our foreign missionaries were better initi into a love for flowers—the most divi beautiful of the Maker's creations—we sh see many living subjects brought hom cultivation, which most of us have n seen, even in a dried state. The plan question has been found to succeed best cool frame, both root and top being supp with moisture two or three times a-day a syringe, allowing the water to fall like They do not require complete rest, as grow even during the winter months. F however, must be excluded. They sh have abundance of air on all favour occasions during the day, and shut up mediately after watering in the evening as to induce a humid atmosphere. They require shading during the hottest part o day from the direct rays of the sun, some light substance such as "tiffany," s to admit as much light as possible wit the plants being scorched, the shading t kept from the plants sufficient to a plenty of air. They are propagated by sets, which should be potted in 60-size in a compost of good fibrous peat and s river sand, to which a little loam ma added at the second potting. Always a ing good drainage, they may be shifted larger pots as they require it: generally, shifts are sufficient until flowering. I experiments tried in a shady situation i summer season, they have been foun thrive well, stood in water in a tank or p up to the rim of the pot. In their n habitat they are found growing on the b of rivulets and margins of mountain stre where the atmosphere is enveloped in after the rainy season.

The only other terrestrial orchids fro Cape, and with which I have had b

limited acquaintance, is Satyrium cucullatum; and as most of the orchids in the collection were accommodated with the common name, this was called the "demi-god hooded orchis," I suppose from the generic name, Satyrium—Satyr, or Satyrus, meaning a sylvan deity—the specific name, "cucullatum," being "hooded," from the hood-like appendages of the flower. The following jotting is from my note book, of September 1858:—"Dwarf, tuberous-rooted orchis, with narrow green leaves, and spike of yellow flowers, had been in the collection some years, but died in the following autumn." It was potted and treated, as near as I can remember, much as I should treat Disa, except that, having a large bulb or tuber, it would require total rest during the winter.

The next species which presents itself prominently to notice is the large purple Orchis foliosa, which in colour, form, and markings of flower is much more nearly analogous to our native O. mascula than any other species, but the leaves, as well as the flowers, are much larger, the latter of a lively green. It is a native of Madeira, where it is found growing in woods and meadows. The same soil and cultural conditions will do for this species, except that it is more tender and requires to be kept in a cool frame, and the pot entirely covered with ashes while at rest through the winter months, to protect it from severe frosts. A quantity of tubers grown together in a large pot or pan, forms a beautiful object in contrast with other orchids, when arranged together in a show house or in a collection for exhibition; but for the latter purpose they require to be re-potted about January, so as to place the strongest tubers in the centre of the pot, more to secure a uniform specimen than could be obtained by allowing them to remain undisturbed. This species has become very plentiful of late years, and may be bought in quantity, in the London nurseries, at a moderate figure.

Other species of hardy tropical orchids, besides the above, would be eagerly sought after if re-introduced, such as one of the beautiful Sicilian species, and which is said to be nearly allied to our native (O. fusca), but the lip is longer, more pointed, and the markings, although similar, more fixed and distinct; but as this and many other species which would grow in cold frames are lost to cultivation, it is not my purpose further to notice them here, other than to suggest that any of your readers, having friends abroad, might be the means of re-importing some of these lost gems. If received by any individual in quantity, they could always be exchanged for other plants, seeds, &c.

The only other orchids suited to frame cultivation, as a distinct genus of the family, are probably the North American Cypripedium; indeed, the strongest plants I have ever seen were planted out in the open border, under the protection of a high brick wall (northern aspect), and covered with hand-lights in winter, much the finest species being C. spectabile, sometimes called alba from the petals being white, the labellum being delicately tinged and spotted with rose. It is said to be chiefly confined to the woods. In various parts of North America the yellow flowered C. parviflorum comes near our native C. calceolus, but is taller, the lateral petals longer, narrower, and much twisted, the labellum being clear yellow. The other two species are much rarer, and little known. C. pubescens, according to a dried specimen in my possession, is also a small flowered one of a yellowish colour, and apparently more hirsute than the others.

C. humilis is a very dwarf growing species the flowers rarely rising above the foliage, which seldom consists of more than two radical leaves; the petals are small, narrow, of a dark brown and purple colour; the labellum or slipper-like form, from which the genus takes its name, is very large in proportion to its other parts, is deeply dented along the whole length of its upper surface, and of a dull light purple colour.

The soil best suited to them is a mixture of turfy-loam, peat, and leaf soil, the surface soil being occasionally stirred to keep it in a healthy state.—*X.*

NEW AND RARE PLANTS.

DIONÆA MUSCIPILA.

THIS very curious plant, commonly known as Venus's Fly-trap, is one of the most remarkable plants known to botanists. It is very local in its habitat, being principally found in bogs and marshy places in the neighbourhood of Wilmington, North Carolina. It belongs to a class of plants called Droseraceæ, or Sun-dews, because the leaves of the plants belonging to the order are generally beset and ornamented with glandular hairs, exuding a viscid, acrid juice, which gives them the appearance of being covered with dew.

In the Dionæa the stems or petioles of the leaves are very broadly winged, while the leaf itself consists of two lobes, somewhat rounded, the two together frequently being an inch in diameter. The edges of these lobes are furnished and fringed with cilia, like an eyelash, but much stouter, while the inner surface of the lobes are furnished with the glandular hairs common to the order. On each lobe, toward the centre of the leaf, are three small, rather stiff hairs, in which resides the peculiar sensitiveness of which we are about to speak.

Whenever an insect attempts to crawl over the leaf, which it can scarcely do without touching one of these hairs, the leaf suddenly closes or shuts up, enclosing its prey in the manner of a steel trap, and the cilia on the edge of the leaf, interlocking like the teeth of a trap, effectually prevents its escape. It has been supposed by some that the object of this arrangement was to supply the plant with nutrition, although doubted by some botanists, including Linnæus; but lately the matter has been set at rest by the experiments of Mr William M. Canby, an American botanist. Mr Canby found that the glandular hairs secreted a fluid which dissolved the insect, and supposed that the fluid was then in some way conveyed to the roots of the plant, and then taken up for its nourishment. After going through this operation, the leaves would re-open and again catch insects; but each time they did so, became less sensitive, and finally lost their irritability altogether. This induced him to try other substances.

He then fed several leaves with pieces or fragments of raw beef, and at the end of ten or twelve days, the beef (excepting some

Venus's Fly-trap.

gristly pieces purposely introduced for experiment) was entirely dissolved or digested by the fluid secreted by the glandular hairs, and was all absorbed by the leaves, which then began to re-open, being almost dry, but appearing to be somewhat callous, or to have lost their delicate texture, and, to some extent, their sensitiveness. It was also found

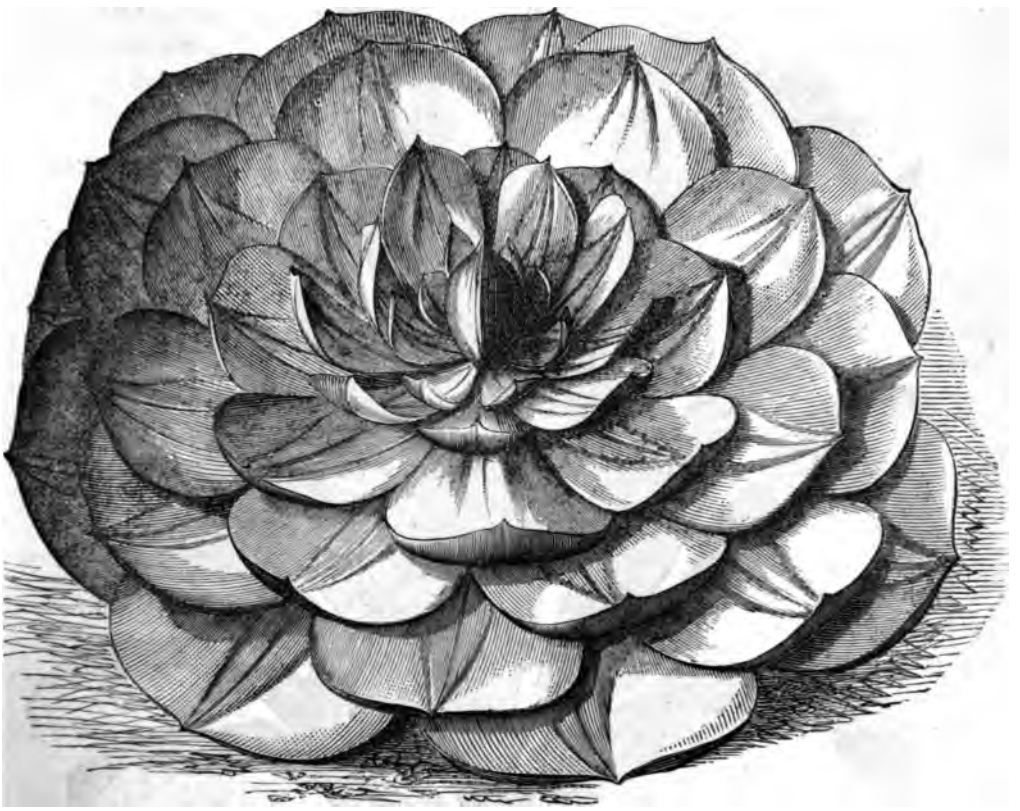
that a slight shower aided their curious digestive process, but too much water appeared to weaken the effect of the fluid secreted.

To shew that this is not the result of the decomposition of the animal matter, a curculio was noticed that had been caught by one of the leaves; it endeavoured to eat its way through it, but, although alive, was very weak, being surrounded by the fluid, which was gradually killing it. This shewed that the fluid was not secreted until after the prey was caught.

Mr Canby tried cheese, another animal substance, but it was only partially digested, and finally killed the leaf, but without injuring the rest of the plant. A large spider was destroyed and devoured by another leaf.

We have here a curious nut for our vegetarian friends to crack—namely, a carnivorous vegetable provided with the means of catching insects of various kinds, and then turning its leaves into a kind of stomach, furnished with a sort of gastric-juice, and deliberately devouring them for its own nutrition.

This plant can be cultivated in small pots of peat-earth, covered with sphagnum or moss, and the pot placed in a saucer of water in a shaded part of the greenhouse. It should be kept continually moist, but never deluged with water. It can be increased by seeds or division of the roots; and the leaves, if placed on damp moss and covered with a bell-glass, will emit plants from their edges.



Echeveria glauco-metallica.

The engraving of this curious plant is from the beautifully illustrated work, the "Vegetable World," by Louis Figuier, recently published by Messrs Cassell, Petter, & Galpin.

ECHEVERIA GLAUCO—METALLICA.

Succulents are now quite a feature in modern gardening. Instead of seeing them by units, we now see them by thousands, for

purposes of summer bedding-out. Mr Gibson of Battersea, led the way, and did so with a will, and with a success which charmed everyone who saw the combinations. His convex beds of Echeverias, set on the snowy-white lap of Antennaria tomentosa, was about as fine a piece of artificial gardening embroidery as could well be conceived, and fairly capped the designer as a genius in his profession. The succulent engraved supplies what neither of its parents could do separately. It is glaucous green, like E. glauca, and tinted of that bronzy hue like E. metallica. It makes a most elegant rosette, and forms a connecting link between plants suitable for grounding, on the one hand, and those rising up standard-like, on the other. E. metallica is a good thing in a young state, but, as the season advances, it becomes leggy, that is, it loses its lower leaves, and is very much in the position of a bare-legged Brahma hen, if it were possible to see such a

Dracœna Mooreana.

thing, or a bare-shanked Scotch kale plant, which is all beautiful and crispy and curly to look at above, but requires muffling below. Even the variegated kales are shorn of their beauty unless their legs are buried very deep down in the winter garden. The hybrid in question has been induced to abandon the characteristic of the legginess of one of its parents, and take to the squatty form of the little elegant glauca. It is now being rapidly propagated, and will soon be as plentiful as either of its parents, having a good constitution, and much that is desirable to aim at in succulents, to recommend it.

DRACŒNA MOOREANA.

This is a strong growing plant allied to D. Cooperii, but a feat upon that variety for vigour of constitution and for effective appearance. Its leaves can be grown to between 4 and 5 inches wide, and to 3 feet in length. The base of the leaf-stalk and midrib are of a bright red, running into a crimson colour, becoming more of a bronzy hue as it becomes older. The contrast between the matured leaves, and the young ones unfolding themselves in the centre of the growth, is very marked. It becomes even more so under the influence of a mild temperature in the presence of light. Darkness is fatal to the production of these colouring processes, which Nature so effectively brings out. The more light, therefore, as a rule, the better the colouring of the plant. Hot suns affect it in a different way from subdued light, they often scorch the delicate tissue of which young leaves are composed. Slight shading, therefore, under the influence of meridian suns, would be very desirable. What adds very much to the attractive qualities above named, is the form which the leaves take, first assuming an upright position, then bending or arching downwards by the force of their own weight, and the whole surface appearing as if on a series of undulations. We have spoken of these plants so highly on all occasions, that further recommendation or notice seems unnecessary, but they are so valuable a set for our readers, or such of those who delight to persevere in the laudable work of indoor decoration, as warrant us in delineating their respective features as graphically as possible.

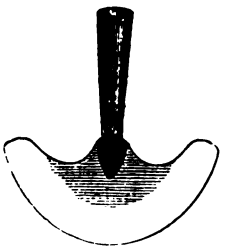
It is one of the South Sea Island group, introduced by the late Mr J. G. Veitch, and has received highest honours at St Petersburg, Hamburg, and London exhibitions. It is named in compliment to Mr Moore, of the Sydney Botanic Gardens.

EDGING KNIFE FOR WALKS.

ALL walks require brushing up, even if in good order. Those that look shabby must be brightened up with fresh gravel, and if they happen to have been well made at first, a turning over of the top surface 2 inches will suffice and make them appear as if gravelled anew. Before all this takes place, however, the first thing to do is to see to the edges. All grasses dont grow and tuft, and shoot out alike, hence the outline, though unexceptional at first, and kept as trim as possible afterwards, will not always remain so. Nothing tends more to give a place a character, be it a large or be it a small one, than trimly kept walks, and the first thing that offends the educated eye is indifferent outline. If this part be right, even supposing the walk is not in tip-top style as to gravel colouring, it will pass muster.

In the multitude of the resources of the mechanical genius we are much assisted in carrying out our operations, not only efficiently, but expeditiously. The spade is a handy tool, but to use a spade at any operation where a trowel would do, is an unnecessary call upon the physical system, and it

hinders rather than expedites the labour. Many people edge walks with a spade, but that implement is only necessary when such walks have got badly out of order. The little implement engraved, in the hands of an expert workman, is the tool for edging quickly and well. It must be sharp in the edge to cut clean, else it will not do its work at all well, and is an additional tax upon the energies of the party using it. No one should attempt to use it without having the line to guide by.



Edging Knife.

The labour, or the time rather, should be more devoted to having the outline as perfect as possible, and then the work when done is done properly, and does not require to be gone over, and re-gone over, patched here, cut there, and unsatisfactory when done nearly everywhere. Let the work be chalked out and understood, and properly formed, before ever the operator attempts to use his edging tool, and then he can go at it, not haphazardly, certainly, but with the certainty that it will be accomplished tradesmanlike. The iron portion of the implement is only shewn. The handle is made of wood, and is about 3 feet long, with a cross handle, like that of a garden fork, for hand guidance and pressure.

GAME PROOF HURDLE.

AS this is the season of the year when all preparations should be made for protecting the growing crops, either for the field or for the garden, we beg to interest our readers, or such of them that require fences for protective purposes, to the game proof hurdle engraved. It is light, elegant, and cheap. It may be introduced as a park fence, and a very excellent and durable one it would make, keeping within its limits any of our herd of grazing animals. It is too expensive for that, however; but as a boundary fence to a garden, nothing would be more suitable, and its ornamental character fits it well for associating with flower gardens, lawns, or any dress grounds. It serves the purpose of keeping cattle within the domain designed for them, and keeps out the herd of vermin that prey upon choice morsels of verbenas and such other plants as might suit the tastes of the gourmands. Once allow one or two rabbits, for instance, to get about a garden, and in time you will soon have a herd, unless the gun and the trap are speedily called into requisition. By this fencing, the proprietor can command all the beauty of an extended scenery, and keep the choice grounds unmolested by a host which would soon destroy its "choice" character.

Game-proof Hurdle.

But this garden-fence hurdling is so manufactured that it is portable at pleasure, quite as much so, indeed, as the more common wooden hurdling that one sees all over the country upon the farm. Farmers who allow sheep to pasture upon the growing turnips, to save labour, and to manure the ground as well, must adopt something like the hen-coop style, that there may be no waste, and that the manuring process may be uniform. Hence the necessity for hurdles and the propriety of having them so constructed as to be portable. In gardening, this course has occasionally to be adopted where pasture and pleasure ground is contiguous. More particularly is the portable plan in demand in park planting, where large trees have to be removed and protected from the animals that

se upon the surface. The hurdles are rally in 6-feet lengths, so that by making uare of them, ordinary-sized trees are erved unmolested, and larger sized ones have double the quantity of hurdling. cost is considerable, varying from 3s. to 6s. a-yard; but looking to it as a protective open wall, and its capability of being set up or removed at pleasure, and at a minimum cost, money might, indeed, be spent for any similar purpose much more disadvantageously.

GARDEN MANURE FORK.

NOTHER article of importance in winter digging is a good garden fork. There e manuring going on in many quarters of garden, and a handy fork is in request. fork engraved differs from the ordinary in having four instead of three prongs. ie have five, and do very well, but the engraved is good enough for such purses as manuring or lifting manure into a el-barrow, to be transferred to the land sumably during frosty weather. In all gardens there is a less or greater quantity nanure. It may be from a piggery, from yre, or from a stable, or, if from neither hese, there is always the ash-pit, and then e is the vegetable refuse, which ought to as carefully preserved as the vegetables cted from time to time for table use. re all or any of these incorporated, and soap-suds, instead of being despatched n the sink, washed down through the heap, fertilizing ingredients would be greatly forced. The decay that is going on makes composition what is called by the farmers "shorter" than piggery, or byre, or stable manure of itself, therefore a close pronged fork is in request, along with a spade or a

Garden Manure Fork.

shovel, to take up what the fork cannot do. Such a fork, as is represented, is just the sort of implement for lifting manure of the kind we speak of, and it is not clumsy, and can be used fully as expeditiously as almost any other implement you could put into the hands of any jobbing gardener or man-of-all-work. It will also come in useful for gathering up many things of a littery kind in the garden throughout the season, and the "set" upon the handle makes it less irksome to the physical system in working it for a length of time.

Work in the Garden during February.

From "THE VILLA GARDENER."

NATURE moves. The progress may be little, the motion slight, but there is a rustling beneath the thick coverlet of winter, and here and there some flower starts up as the only harbinger of a coming spring-tide of growth and beauty. Sweet violets open their eyes to look about them. The early forget-me-nots bare their azure bosom to the open face of the sky. Primroses wake up from their winter pillows of rough, rugged leaves; early crocuses tips ome earth-clod with gold; tall, fragile snowdrops rush forth into the pale light and then droop back, earthwards, as if repenting of their early rising, when the harsh winds roughly arrest their fair forms; and there is a gentle whispering stir among the buds as if they were telling each other that spring was near, and the buds hurry forward to meet it. Larger and yet larger they grow, plumper and yet plumper they become, thinner and yet thinner grows their winter coverlet, and thus ready they wait for the voice of spring to summon them forth from their wintry sleep. The night of rest and apparent stagnation is far spent, the day is at hand. And on those mild days which we often have early in February, one seems to hear the rush of the sap, the soft rustle of spring leaves, and the gentle movement of expanding blossoms. Our hearts are in sympathy with reviving Nature. The wintry hardness is gently, imperceptibly dissolved, thrown into mellowness of character and feeling, and a new impulse of love and happiness bounds forth, quickening, vivifying, strengthening, gladdening every faculty of feeling, just as this rising sap nourisheth and filleth the entire plant. The year has turned its face from the cold, bleak wall of death and sleep to that of life and joy and beauty. We look forward now instead of backwards. The tide of life is rising towards us, not ebbing slowly from us. The swelling buds are big with sweet promise. February is a time of excitement to the lover of horticulture, who is only too apt to verify the proverb, the "more haste the less speed." It is a sort of interval between awakening and arising in bed. Nature rubs her eyes and thinks about it, rather than starts up in her delicate fresh spring robes. We must copy her example, and not be deceived. It is folly to forget that rough, surly March, with his icy breath and freezing fingers, has yet to come and test and try all premature growths to the utmost. Therefore, in February we must not force Nature forward, but keep her back as much as possible. The month is somewhat like an over-confident, but inexperienced young man or maiden who has just had the reins placed in their own hands. Away they go as if nothing could stop them. But soon a block—an accident, an upset—happens, and it is well if they come out of it only sobered into sedateness by experience. Alas! how many fair buds have been blackened for ever! It is just so with mild growing February. Vegetation goes on, and we are assured by appearances that one day will be as favourable as another, and even more so, till at last March winds, shorn of ice and snow, undeceive it when too late, and the cold grip of the frost deals out death to the blighted flower, or rather blasted branch. Caution, fringed with hope, must be our motto for the month. To enjoy all the crushed movements of the coming spring without impatience, or helping them forward, will constitute our happiness, and define our duty as we do our work for the month.

THE KITCHEN GARDEN.

The work here must, to a great extent, be regulated by the weather. If heavy rains prevail, we must wait till the surface becomes fairly dry. Nothing is gained, but a great deal lost, by attempting to work upon ground when it sticks to your feet like birdlime—culture is impossible under such conditions, and growth may be indefinitely hindered by converting the earth into a hodge-podge of mud and water. More harm may thus be done in a few hours than can be righted in a whole year, for the earth resents such bad treatment. It cannot be trod upon in a wet state with impunity; it loses its temper and becomes sour; it breaks up its constitution, and reduces its growing quickening force to a dead inert mass of sodden, useless earth. The earth is grateful for our attention while in a dry state, but when wet, it prays us through every breathing pore to let it alone. Fortunately, the frost takes the matter into its own hand; we cannot crop or cultivate while it locks the surface with its strong bars. But we can, as pointed out last month, transport our soil, compost, manure, over the surface without injury, and with a less amount of transporting or carrying force. Hence, all carting or wheeling, if not already done, should be at once completed, as the frost may soon depart and not return again with sufficient strength for the accomplishment of such needful work. We not only save labour by wheeling and carting in frosty weather, but protect the ground as well. Heavy loads, borne over arable land, even if moderately dry, are injurious. They derange its mechanical structure, and injure its texture. All this may be avoided, and the labour vastly lightened by completing all wheeling during frosty weather.

hat every yard of vacant ground is likewise
p to the influence of the frost. A heavy loss
ned by all ground that is not dug or roughed
re winter. Every raw surface begs, borrows,
; much nourishing, enriching matter from the
ch it could not absorb in an unmoved state.
al or winter digging thus equals a coat of
in addition to the marvellous mechanical com-
ns effected by the air, the rain, and the frost.
h all these heavy and important works well
ed, doubtless the weather will furnish facilities
eedful cropping during February.

ure the chief crop demanding attention. Two
of these should be made during the month.
peas, such as Early Frame, or Knight's Tall
s, should be sown nearer together than from 3
. It is better practice still to scatter the pea
wider distances among other crops, such as
, cabbages, cauliflowers, borecole, &c., in
ows in one place. By this move, the peas are
posed to light and air on all sides, and the
enormous. Now, about the first of the month,
gleader, Essex Rival, and Laxton's Supreme,
Green Marrow, which is nearly as early as
About the middle of the month, sow such
as Fairbeard's Surprise, Hair's Dwarf Mam-
Ne Plus Ultra, and Veitch's Perfection. In
ardens, where only dwarf peas can be grown,
om Thumb, M'Lean's Little Gem, Bishop's
od, and the Dwarf Waterloo—a marrow of
vour, and very prolific.

f Beans may also be sown twice during the
in fact the main crops should be got in about
of February. Early Mazagan, Dwarf Fan, or
—a good dwarf variety—Snow's Long Pod,
Windsor, and Johnson's Wonderful, are good
. Many plant these among early cabbage, or
the rows of potatoes. If planted for a crop
selves, about a yard between the rows will
sary, and the beans from 2 to 4 inches apart
wing.

ges.—Make up any blanks among the autumn
sorts; hoe and earth up if approved of. A
f seed may also be sown of any good early
h as the York or London Market, for a suc-
of summer cabbages. These should be sown
m spot.

li.—Cut when fit for use, examine almost
end down the leaves over any that are shew-
place a few boughs over during severe frost.
pinch of Walcheren seed in a warm spot for
n to the spring cauliflower.

flower under protectors or handlights.—Pick
leaves, move the surface soil, give air on
s, and protect from severe frosts.

es.—Encourage to grow under glass; sow a
f early sorts. Protect those in the open
against walls from birds, early slugs, &c.

ts.—Sow Early Horn on a warm border.

Radishes.—Sow Wood's Early Frame, and Red and White Turnip varieties.

Onions.—Prepare the ground thoroughly for trenching and heavy manuring, leaving the surface as rough as possible. Top-dress with soot, and a sprinkling of salt in mild weather: this will settle slugs and worms, and form a good stimulant for the onions. When the surface is caked with frost turn the cakes over, exposing a fresh side for the frost to bake hard. The oftener this is done the better. It is better not to sow the seed this month. Some, however, prefer transplanting their onions, and such ought to sow them on a seed bed now, and transplant on to the prepared onion ground as soon as the plants are large enough to handle.

Eschallots.—Where these or potato-onions are grown, now is a good time to plant them. Insert in drills 15 inches asunder, 2 inches deep, and from 6 to 9 inches between the sets.

Leeks.—Sow the London Flag or Musselburgh, or any other large sort in a seed bed, to be transplanted on rich soil as instructed, at the proper time.

Potatoes.—Plant a few of any of the early sorts, such as Rivers's Royal Ashleaf, Walnut-leaved Kidney, Mona's Pride, Early Daintree, Early Oxford, Dalmahoy, or any other favourite variety, in the warmest positions. Plant at this early season at least 6 inches deep, and during severe frost scatter a little litter or a few boughs, over the ground. It forwards these early crops very much to plant on the southern side of a high ridge, as has been formerly recommended and described.

Such crops as *Jerusalem Artichokes*, *Rhubarb*, *Seakale*, and *Horse-radish*, may be got in. For the last three, deep rich soil should be chosen, as they will remain several years on one spot. There is no better variety of rhubarb for all seasons than the Victoria, and the roots should not be planted nearer to each other than a yard. The entire root should be buried, and the crowns of the plants merely be left above the surface. Seakale should be planted in rows, 30 inches asunder, and the plants 15 inches from each other. Horse-radish is generally planted in rows 18 inches or 2 feet apart, and 6 or 8 inches from plant to plant. The ground should be dug at least a yard deep. It is common to make holes with a poledrift, to a depth of 2 feet or more, and thus to drop a crown of horse-radish with 1 inch or so attached, into the hole, and fill it up with sand or fine earth. Another mode is to take a small piece of the root like a whipcord, and place it in the hole instead of the crown, filling up as before. A more novel system is to lay these thin pieces flat on the surface and cover with about 4 inches of soil. Good horse-radish may be grown either way for our roast beef. Jerusalem Artichokes are much liked by some for soup, and eaten plain boiled like potatoes. They should be grown on a boundary line, as they rise like sunflowers to a great height. A foot apart is close

enough for them, and they are altogether too coarse and strong for the general run of villa gardens.

Routine.—Remove all dead leaves from brocoli and savoy plants as used; destroy weeds; sweep, roll, turn, hoe, and rake walks, and see that the garden has a cared-for, clean appearance.

THE FRUIT GARDEN.

Finish as early as possible any planting that must be done this season, whether of trees or bush fruits. Mild, dripping weather should be chosen for these operations. Trample the ground as little and as lightly as possible. Put the trees in with the utmost possible despatch. Mulch and fasten them at once in such manner as shall make them fast against wind, &c., but they may sink, however, with the subsidence of the soil.

Root Pruning may still be proceeded with. But unless the need is urgent leave it till next October. The theory and practice of this panacea have been fully given. (See *Root Pruning*, p. 306.)

The *Pruning* and *Training* of all fruit trees and bushes should now be pushed forward in favourable weather. Every preparation should be made beforehand, so that every hour may be utilized in the open, when fortune favours, the sun shines, or the air proves soft and balmy. More work may be done in snatches of favourable weather than by attempting to train, nail, or tie in all weathers, because the latter mode begets despair, whereas the former gives a succession of fill-ups, which makes the work light and easy. In all training operations see to the old fastenings before making new. Prove their stability, and test their size. The latter is the most important point connected with training. No end of plants have their symmetry marred, their health ruined, through neglecting old ties, shreds, or nails. These eat through the bark, cut and corrode the wood, unseen and unthought of, and beget canker and a host of diseases, and induce sudden deaths when least expected. Our young trees, or fast-growing plants of any kind, should have every shred or tie examined, and, if need be, removed each season. If it is at all firm now it will bite deeply into the bark or wood before the end of the year. In making fresh ties or shreds see that space is left for the growth of the wood, and that if nails are used they are placed clear of the growing shoots, with sufficient margin for rapid growth. Such minutiæ are the essentials of training. The form of the trees, direction of the shoots, distribution of the material, ever-important though they be, on cultural and artistic grounds, are as nothing to these vital matters regarding the health involved in neither pinching nor bruising the shoots. They are, however, very important, and the more equally the wood can be distributed, and the straighter each branch can travel in its designed direction, the better for the appearance and well-doing of the plant. There is another point of great importance in training—to take care neither to rub nor knock off the fruit buds. Such buds are always the most prominent, and they are easily knocked off. Villa gardeners are apt to stand too close to their work, and if at all of aldermanic proportions they make a clean sweep of most of the best fruit buds before they are aware.

As to pruning it is well-nigh impossible to teach the art by books. Remove as much old and worn-out wood as possible, and recruit with fresh wood sufficient to fill its place. The distance of the shoots apart on peaches, nectarines, apricots, cherries, and plums, may range from 4 inches to 9, or even 1 foot. Apples and pears are trained on a different plan. The leading or main shoots are permanent, the young now, on such being spurred back close to one or two eyes or buds. In cutting these off, however, a whole forest of buds without growing ends are generally found near to them. Leave these alone; they are, or will bear, fruit spurs.

After thinning out the old wood from stone fruit-trees the young shoots will need shortening back to from 6 to 15 inches of their base. Short wood may have to be cut back to 2 or 3 inches. The chief object of this beheading of the young wood is to start all the buds back along its entire length. Without such cutting back, probably only a few buds at the upper end would break into shoots, and the tree would speedily become bare of fruit-bearing wood from the root upwards. The object of pruning is to keep the whole tree, from bottom to top, furnished with fruit-bearing wood.

Before, however, training fruit trees, see that they are clean. Pruning and cleaning in skilful hands go together. A sharp eye and a keen pointed knife are about the most efficient destroyers of insect pests. In pruning, every bit of dirt, every insect nest, is removed, rifled, and totally destroyed. Much larvæ, &c., will be found hidden in crevices in walls, stored away behind branches, and buried deep into dark crevices. All must be hunted out and removed. If the trees are much infested with scale or other insects, all loose bark should be scraped or scrubbed off with sand, soap, and water, with as much care and thoroughness as a dirty floor in the dwelling house. The trees should likewise be loosened from the wall or fence, and then also scrubbed and cleaned. We have seen excellent results arise from syringing dirty walls during frosty weather with hot water at 150 deg., and then dashing cold water on their face till every crevice was filled with ice. The sudden change proves fatal to insect life, and this mode of blowing hot and cold in rapid transition proved a cheap mode of cleaning dirty walls. That is cheap at first cost. Of course the frozen water tended to enlarge every crevice, and make more room for the insects of the future. Dead trees sometimes become bark-bound in a curious manner. The bark refuses to swell above the growing wood, and holds the cambium as in a vice. Dress such trees with lamp oil, and run a sharp knife up one side of the skin, right through the bark.

intended for grafting may be headed back th. Leave the scions still in the earth, behind vall. If any have been forgotten, get them ly, and lay them in a cool place in the earth.

grafting should be mixed with water, and nto a mortar, and all stones removed. It nder after lying and being mixed up several Mix about a-fourth of horse dung with it to- ıe end of the month, and give it a final heat- mixing ready for use in March.

ress fruit tree borders, and mulch with dung : roots of exhausted trees. Use only fresh · top-dressing, and feed solely from the surface, ith solid mulchings or dressings of sewage or water. On well-drained borders such dress- now be applied with advantage. There are wing crops now to utilize such manures. t is a good time to enrich the root-runs for our :s and bushes. Gooseberries and currants are of such food, and if applied overhead at this of the year, manure water will not only the roots, but protect the otherwise sweet ım the ravages of birds. Strawberry planta- ılched with straw litter may likewise be soaked wage, to the enlargement of the fruit and ening of the plants, and new runners by and by. ɔrse, or pig urine must not, however, be used Two or six parts of water must be added for ses. If there be any excess of sewage after sed for these purposes, let it be poured over and compost heaps. Our vegetables will thank ıch gravies to their solid food during the com- mer.

stores.—Examine for decay, and see that frost ıded.

THE FLOWER GARDEN.

h all alterations as soon as possible. Trench ll vacant spaces or flower beds. Wheel and mposts or manures. Complete the laying of l the planting of deciduous shrubs.

ıre the ground for planting or transplanting *greens*, which had better be deferred until April. ter is the best month in the whole year for the ɜ of evergreens, provided the tops are well ɔd during dry weather, and the roots are well l. All ground should be trenched and roughed nce, and be ameliorated by the frost, the rain, : air; or where the entire ground cannot be ith, the holes for the trees or shrubs should ɔwn out in readiness. This will sweeten as enrich the soil, and prepare a fine tilth for the ɔ run in. Shrubberies in general, and rhodo- ıs in particular, are much benefited by a top- ɜ of leaf-mould, or well-rotted hot-bed or ng, incorporated with equal parts of earth. Two inches of this laid on the surface as a mulching a most useful stimulus.

old practice of winter and spring digging shrubberies was barbarous and cruel. Hardly had the best roots got a peep at the surface-soil, when thrust went the spade, and cut and rent them off. The surface should be kept clean by hoeing the weeds when in a young state, but neither spade nor rake should touch the ground between shrubs. The best antidotes to weeds are thick planting and surface mulching; the former smothers the weeds, and encourages growth by the help of mutual shelter; the latter covers over and kills annual weeds. The best mode of keeping shrubberies clean is to cover the whole surface with shrubs.

No harm, but much good, comes of thick planting, if timely thinning is practised. As long as the plants begin to overcrowd each other, out with some of them, and, in doing so, study the welfare of the plants left rather than the good of those removed. The reverse is the usual practice. The thinnings must be saved, and made to grow at all hazards, at whatever sacrifice of roots to the shrubs or trees left. Those, instead of growing better, often date their decline from the thinning. There are two reasons for this. This thinning is often carried to excess. When this is the case, the thinned-out shrubs are like a man stripped of his coat, exposed to a nor'-easter. They get a chill which arrests growth, and ruins their constitution. A little at a time is the rule of safe thinning. The second reason is, the loss of roots. These are cut off in a wholesale manner, to provide balls for the plants removed; and of course the plants left feel the deprivation and refuse to grow in consequence.

The remedy for all these evils is, to reduce both root and top of the plants removed, and to leaving those remaining as near as may be intact. In one word, the thinnings must not be held subordinate to the plants thinned.

Hardy Roses.—These may be staked anew, labelled afresh, and such sorts as hardy climbing varieties trained and trimmed. Banksian roses must not be touched at this season. The old wood should be cut in as soon as they are out of flower, and the whole summer growths left to flower again next spring. Austrian and other briers, such as the Copper, Persian Yellow, and Harrisonian, must only have the weakly shoots thinned out, and the others left nearly at full length. If spurred like other summer roses, the supply of bloom will be scant indeed. Some of the Teas and Noisettes, such as Cloth of Gold, Solfaterre, Celina, and Marechal Niel, should be thinned out, and the strong shoots left long also. It is too early to prune Perpetuals.

Now is a good time to top-dress roses. The material can hardly be too rich. Night soil, pig, cow, horse, pigeon dung—the latter, soaked in urine, form good top-dressings. If fresh, their strength should be lowered by using cent. per cent. of strong loam or burnt earth.

Pansies, *Pinks*, and *Carnations*, in the open ground will require attention after frost. Make the loosened

earth firm around the collars of the plants, and keep the surface loose with a hoe. Hardy annuals, polyanthuses, primroses, hepaticas, aubrietias, forget-me-nots, arabis, daisies, &c., fresh planted in the autumn for spring flowering, will require similar attention, as sharp frosts on the wet surface are apt to throw them almost out of the ground. As soon as the frost gives way, attend to the solidification of the plants.

Crocuses.—Guard against mice and sparrows. The former often tunnel rows underground, and consume all our beauty unseen. The latter scrape away the earth to pick a meal out of our embryonic beauties.

Tulips are in even more danger from mice and rats. The beds should be hooped over during severe or wet weather with mats, as great mischief is often wrought if the frost catches the flower just on the surface of the earth.

Ranunculuses and *Anemones* may still be planted. Decomposed cow-dung is, from time immemorial, the *sine qua non* for the successful cultivation of the former. Anemones will thrive well in any common garden soil, though they deserve the very best.

Where *new Lawns* are to be made by sowing seeds, the ground should now be prepared by trenching, or digging, or draining if need be. A dry bottom is essential to the enjoyment of a grass lawn. If this is wanting it will become a delusion and a snare, a mischievous invention for the manufacture of rheumatic patients. If the soil is very poor enrich it with a coating of well-rotted manure. Liquid manure would ruin all, and moist soils of average quality will be rich enough to grow a good turf without dung. The soil should be carefully dug or trenched, as for any other permanent crop. Next month we shall give instructions for preparing the seed bed, and sowing a grass lawn.

Routine.—Make new borders, walks, top-dress, turn, or hoe, rake and roll the same. Sweep and roll new lawns. Lay box or other edgings, and if the weather is open or mild, dig among, clean, and divide herbaceous plants, in established beds or borders. See that no litter is left about, nor work allowed to lag behind, as, doubtless, March will bring work enough in its bustling train, without being hampered with February's arrears.

PITS AND FRAMES.

Covering, air, water, heat, summarize the chief points here during the month. Cover sufficiently to exclude frost in all: cover extra to keep in heat wherever a growing temperature is needed. If cucumbers are started now, a temperature of 70 deg. to 75 deg. will be needed to grow them well. It takes much heat inside, and a thick covering outside, to maintain this warmth, when the outside thermometer is making tracks towards zero. Dry straw in a loose state, or straw or reed mats, or wooden shutters, are our best friends under such circumstances. And the pit or frame should be lined all round with a layer of hot dung, say 18 inches or 2 feet, or even more thickness. So protected, the cold cannot reach the frames, unless through its glass tops. And there our covering should render it invulnerable.

Air must play hide-and-seek with the temperature, and especially with the sun, to do much service in warm pits in February. Still a little must be given as often as possible; yea, more if our source of heat is active and powerful; a little always without draught is the safest and best course. In cool pits and frames the matter of airing is simple enough. When the thermometer is above 40 deg. give any quantity with impunity, to pinks, carnations, auriculas, and bedding plants, in the state of rest. But potatoes or bedding plants in a growing state, cuttings, bulbs that have been forced forward, these must be carefully aired to prevent a chill, which means a stoppage of growth, and may be death. Water must be given sparingly at mild times and seasons. Much better that the inhabitants of pits and frames should suffer from drought in February, than an excess of water, or that they should catch cold in the administration of the needful supplies. Water early in the day, apply it only to the roots, and give no more than is absolutely needed. An excess of heat must be guarded against with almost equal care. The weather is dull, the sun has lost its power, and too much heat means weakness and ruin. Such plants as cucumbers and others, must have heat enough for their tender constitutions, but beyond that it must not be carried; and all hardy plants in a state of rest must be kept as cool as possible.

Auriculas, *Carnations*, and even *Verbenas* at rest, had better be slightly frozen than exposed to a temperature of 55 deg. to 60 deg. From 40 deg. to 45 deg. is a safe temperature for most half-hardy plants in pots and frames.

Calceolarias, *Cinerarias*, re-pot or remove to glass-house.

Pelargoniums.—Give their final shift into flowering-pots. Start the bedding varieties that you are scarce of into growth. Likewise verbenas, ageratums, or other bedding plants.

Sow *Lobelia speciosa*, *Golden Feather*, or other seeds that may be wanted in quantity for the flower-beds. Place dahlia roots or Salvia patens in a warm pit to excite growth.

Cuttings of verbenas, pelargoniums, ageratums, heliotropes, fuchsias, lantanas, petunias, &c., may be inserted as soon as young growths from 1 to 2 inches long can be had. A temperature of 60 deg. will be suitable for rooting all bedding plants. No starting will be needed at this early season if the cuttings are plunged about 1 foot or 18 inches from the surface of the glass. Remove bulbs or other plants as they shew flower, to the glass-house, and keep the plants clean by fumigation if necessary, and by the removal of all dead flowers and leaves.

THE GLASS-HOUSE.

tain the temperature at 40 deg. to 45 deg. with t, allowing a run of 10 deg. with the sun on lays. As the days lengthen give more air and The brighter light will enable the plants to ıte more food and use more water. Fuchsias : encouraged to grow strong by being placed in ıtest part of the house. If they break weak, it ult to get them out of it afterwards. A strong ıs start generally wins in plant growing.

:, *Fancy*, and *French Pelargoniums* will now be g freely, and will need training and starting All dead leaves should be picked off, very weak cut out, and the strong ones evenly distributed. ettiest shape for these plants is a hemisphere, hat raised in the centre, and projecting from 6 to 1 foot beyond the rim of the pot. For owering the plants should now be stopped. fly is sometimes troublesome at this season. with Appleby's fumigator and prepared to- at once. It is a positive pleasure to do so. : the fumigator, place it inside the glass-house, ıtch the rising cloud fraught with death to every rom the outside. Not a leaf or flower will be ured, while every insect will be killed. Com- ıis with the old, barbarous modes of fumigating, were warranted to half-kill the operator, whilst he pests got off scot free.

'hs, *Epacrises*, and *Azaleas* coming into flower quire more water. Camellias must not be over- l. This is apt to make them cast their blossom- ınd to spot the flowers. Chinese primroses will ırger supplies of water, but on no account must ı the hearts of the plants. The double varieties dure more heat than the single ones, and should ed in the warmest part of the house. These valuable for cutting. The Greenhouse, if devoted to plants, will soon be gay with es, heaths, camellias, cinerarias, primroses, cyclamens, crocuses, hyacinths, narcissuses, , and perhaps a few forced shrubs—such as Ghent azaleas, kalmias, from a portion of the frames devoted to make the glass-house gay in ing.

n bedding plants are stored here, the little eat prescribed for the month will be useful to growth, to prepare wood for cuttings, and, if nted for this purpose, a few early flowers on ıniums or verbena cuttings will do the plants ıarm, and be most grateful enliveners of the Sweep all scrupulously clean, see that wood- glass, climbers, are scrubbed, pruned, or , and all ready to welcome March with clear d ready service.

THE VINERY.

villa gardener may now start his vines. Let . be your minimum temperature for the next weeks, and 50 deg. your maximum with fire heat. Syringe the vines with water of the same temperature, or 5 deg. warmer, night and morning, and keep the whole surface of the house sprinkled two or three times a-day. In fact, aim at reproducing an April morning—cool, moist, soft, and genial. The last week in February, add 5 deg. more. As soon as the sun raises the temperature to 55 deg., give a little air to 60 deg. ; give so much as to prevent that being exceeded. If no sun shines, you need not trouble about air during the first few weeks. The vines cannot breathe much yet, and if kept cool they will not become weak for the want of it.

THE ORCHARD HOUSE.

This we must suppose to be unheated, and therefore the trees must be kept dormant for another month if possible. "Why, they are starting on the walls!" So much the worse for the walls, I answer. One great advantage of having trees under glass is to keep them later than on walls. Every gleam of sunlight hitting trees on walls, or absorbed by the latter, summons forth the sleeping flower buds. Now they often come at the sun's bidding, to be wrecked and ruined by frost. But the orchard-house atmosphere is more steady, and less warm then the atmosphere playing hide-and-seek with the ever-changing elements on the face of an open wall. Therefore we can keep the trees back throughout this month by sweeping a current of air right through the house, night and day, unless during severe frosts. The shelter of glass allows us to practise two other modes of keeping the trees from growing. One of these is dryness at the root. This, however, must be relaxed now, and the trees must be watered two or three times during the month, so that before the end of it every atom of soil and every rootlet should be thoroughly moistened. If this is not done several weeks before the flower-buds open their bright eyes into full bloom, the probability is that a good many of them will drop through the want of water. The second expedient is temporary shade through bright sunshine. This cheats the plants into a longer sleep. The sun is the great stimulator of sleeping flower-buds. Withdraw his influence and they sleep on. Two hours sunshine will do more to expand fruit-buds than two weeks of a warmer weather under a cloudy sky. A mat or two thrown on the south side of your orchard-house will help the trees to sleep on soundly, and take their rest soundly, throughout the month.

The importance of this I shall explain when I tell you to go and awake them on the 1st of March. To have all in readiness, and also to find some work for idle—and it may be itching with anxiety—hands to do. The trees might all be arranged and carefully placed in their summer positions. If small, 18 inches apart will do for the first season ; if large, 2 feet, 2 feet 6 inches, 3, 4, 5, or even more feet, may be necessary. A clear space of 1½ or 2 feet should be allowed between

each two trees, to allow growing room, and the full force and play of the sunlight between them. Finally, look out for aphides, which often prey upon flower buds in a dormant state. If you see an ant capering about, depend upon it green or black fly is at hand. Fumigate with tobacco, or crush, or wash the fly off at once. Don't believe that the ants will eat it up. They won't, but rest not till every ant as well as fly is utterly extirpated, as it is an open question which is the worst pest among stone fruit.

"Oh, how nice to see those little tomtits, chaffinches, and bulfinches, come in to look at our trees." Nice, indeed! Out with them at once, or they will eat the whole of your dessert in the bud, before you can even see the promise of fruit. "What will you do with the birds?" Catch 'em and eat 'em; cage them, frighten them, kill them—anything you like; but as you look for fruit, or hope to eat it, allow none of these small birds, or any other kind, to set foot or flap wing in your orchard house.

Arboriculture.

USE AND VALUE OF SCOTTISH TREES.

BY CHRISTOPHER YOUNG MICHIE, FORESTER, CULLEN HOUSE.

E have observed that the longer the period is between that of sowing ›ing, or planting and cutting down a in proportion are the risks of failure . For example, our ancestors planted ›ry abundantly, on account of its ex- use in their time for machinery, and ı purposes it realized high prices. , therefore, such as the Earl of Find- ›ord Blantyre, Lord Kinnoul, the f Hamilton, and many others, who ›d upon the same prices being re- hundred years hence, lost by such an ›nt. The Duke of Athole also, who larch extensively, on account of re- as he did at the time, from 2s. to 3s. ic foot might have found a narrow ıad he lived to see it sold at half that)n the other hand, those who planted e at the same period, when the wood cely sought after, and only to a limited ›r turnery purposes and fuel, would happily surprised to find a better and different application of it in con- with the manufacture of cloth and goods, for which purposes double or e prices realized fifty years ago are ›ained. Those planters also, who, ›r the sake of variety of trees upon ıtes, or the pleasure of seeing them quickly only to be cut down for sub- purposes, without regard to profit, ıow be happily surprised to find er, poplar, willow, lime, and other lescriptions of wood, which at the planting were all but unsaleable at e, are now eagerly sought after, and ›h, highly remunerative prices are given. It may, therefore, safely be assumed, that as trade and commerce have undergone changes and fluctuations in the past, so will they also in the future; hence the difficulty of predicting what the state of affairs will be as affects the price of wood fifty or a hundred years hence. That which now demands the highest price may, for aught that we can tell, realize the lowest after, and *vice versa*. Arboriculture, thus differing so vastly from agriculture or horticulture, causes it to be dealt with in a way and manner essentially different from either. Probably the best and wisest mode of procedure is to act upon the maxim, "present duties belong to man, and issues to God." It is therefore best to exercise to the utmost the faculties of reason and discernment, and act in regard to Arboriculture as in other matters, by doing that which at present seemeth right, leaving the future to provide for itself. In the matter of growing trees we have, fortunately, many guides and instructors.

We shall endeavour, as briefly as the subject will admit of, to explain the circumstances under which several woods and plantations have succeeded and done well, and several others have not.

I. Is a Scotch pine plantation, 90 years planted, comprising about 100 acres, with a hundred trees per acre, each tree containing about 30 cubic feet of timber = 3000 feet at 1od. per foot = £125. This sum, divided by 90 (the number of years old), gives £1, 7s. 9¼d. as the yearly return per acre, while similar ground to that occupied by the plantation is worth 10s. per acre for grazing purposes. Allowing, for the sake of brevi-

the thinnings and shelter afforded to the surrounding fields to stand as a set off against compound interest upon the sum originally invested in planting, the results stand thus—

Value of crop of wood . . .	£125	0 0
Expense of plants and planting	£4 10 0	
Rent of ground for grazing purposes .	45 0 0	
	49	10 0
Balance in favour of planting	£75	10 0

II. Is another Scots pine plantation, 50 years old, comprising 1600 acres, containing on an average 500 trees per acre, and valued at 1s. 6d. per tree = £37, 10s. The ground for grazing purposes, being of the poorest description, was worth only 2s. 6d. per acre. The comparative value of the ground for grazing and planting, abating as in the former case compound interest upon original outlay, stands thus:—

Crop, 500 trees, at 1s. 6d. each .	£37	10 0
Rent of ground . £6 5 0		
Cost of plants and planting 4 0 0		
	10	5 0
Balance in favour of planting	£27	5 0

The produce of this plantation was chiefly manufactured into staves, for the Newcastle market, or sold as pit-props in Paisley or Glasgow.

III. A Scots pine plantation, comprising about 200 acres, and seventy-five years old. The trees—

168 trees, averaging 15 feet each = 1520 feet, were sold at 7½d. per foot =	£47	10 0
100 spar-wood trees, 5 to 8 in. diameter, at 12 ft., at 1s. each =	5	0 0
80 prop-wood trees, 3 to 5 in. diameter, at 12 ft., at 4d. each =	1	6 8
Total value per acre	£53	16 8

Value of planting as compared with grazing, abating compound interest upon original outlay, as above—

Value of crop of wood . . .	£53	16 8
Cost of plants and planting per acre . .	£3 10 0	
Rent of ground, 75 years, at 2s. 6d. per acre .	9 7 6	
	12	17 6
Balance in favour of planting	£40	19 2

The produce of this plantation was manufactured and used as follows:—The largest and best of the wood for roofing, flooring, and other building purposes; the coarse and more inferior class for railway sleepers; a smaller class was sawn into sleepers for mining purposes, staves, and heading; and the smallest description for pit-props.

IV. Is a growing Scots pine plantation, forty years planted, and containing 40 acres, with an average of 300 trees per acre, each on an average is worth 2s. = £30. The ground, for grazing purposes, is worth 10s. per acre; and assuming that the plantation would not increase in value more than the present worth of the ground for grazing, the present balance would stand nearly thus:—

Enclosing plants and planting per acre.	£6	0 0
Rent of ground for 40 years at 10s.	20	0 0
Total amount of outlay . .	£26	0 0
Value of crop, as standing upon the ground	30	0 0
Balance in favour of plantation	£4	0 0

V. Is a larch plantation, comprising about 10 acres, which was duly thinned to thirty-two years' growth, when it contained 120 trees per acre, each tree averaging 25 cubic feet. The ground previous to planting having been under cultivation, induced the trees to make very rapid progress in growth; but at the above age they had already begun to indicate signs of decay, which occasioned their being cut down. The ground, which was a sandy clay, was by no means valuable for agricultural purposes, being estimated only at 15s. per acre.

The comparative results between agriculture and planting, in this case, stands thus :—

120 trees at 25s. each . .	= £150	0 0
Original expense of plants, planting, &c. . £3	0 0	
Thirty years' rent at 15s. per acre =	22 10 0	
	25	10 0
Balance in favour of planting	£124	10 0

It is here worthy of remark that this is one of those exceptional cases where ground pays better under planting than under agriculture, and it is well to study the nature and capabilities of the soil for producing any particular description of crop of trees before planting. The agriculturist and horticulturist set before the arboriculturist many examples worthy of imitation in this respect.

VI. Is a series of larch plantations, comprising about 150 acres, and fifty years old. The trees, on an average, stand from 14 to 17 feet apart = 150 to 200 trees per acre, and contain from 5 to 50 feet of timber each. In this, as in most other plantations of considerable extent, there are portions not worth one-fourth of the sum stated in V., as above; hence the difficulty and uncertainty of ascertaining, without valuing the whole plantation, tree by tree, the proportion of good and inferior crop.

An important circumstance, and worthy of notice, in connexion with these plantations is that of the value per acre, being just the inverse of the number of trees upon it. Where the number of trees is fewest, the value is greatest, and *vice versa*.

The respective valuations of the plantations are as follows :—200 trees at 8s. each = £80 per acre; 170 trees at 10s. each = £85 per acre; 150 trees at 11s. 6d. each = £86, 5s. per acre. Taking the average at 170 trees per acre, containing 10 feet each = 1700 feet, at 1s. per cubic foot = £85, and the original cost for enclosing plants and planting—about £6 per acre. The value of the ground for grazing purposes is from 3s. to 5s. per acre, and shews the comparative advantages between planting and grazing.

Average value of crop (at fifty years old) per acre	£85	0 0
Cost of plants, planting, enclosing, &c. £6	0 0	
Rent for fifty years, at 5s. per acre .	12 10 0	
	18	10 0
Balance in favour of planting	£66	10 0

Having cited several examples illustrative of the comparative profitableness of planting, resulting, as has been shewn, or may be inferred, from the trees being well adapted to the soil, without which a planting must fail, or prove a loss, we shall next quote a few examples of failure of growth, without adverting to losses sustained by other means, such as sales, manufacturing, and such like.

VII. Is a mixed plantation of about 12 acres, and forty years old, composed of at least eight sorts of trees promiscuously mixed. The tendency of the plantation has uniformly been for the trees to prolong their upward growth at the sacrifice of their girth; and the treatment necessary to maintain the balance between height and girth has been such as to cause too many trees to be thinned out before they were of any appreciable value, and leave the crop too thin upon the ground to be afterwards profitable.

The present market value is a little below £20 per acre, whereas upon such ground it should have been at least worth £30 per acre.

The following statement will shew the comparative failure or unprofitableness of the plantation, viz., 144 trees at 2s. 10d each, per acre . . . . . = £20 8 0

Rent of ground, at 15s. per acre, for forty years	£30	0 0
Original cost of plants, planting, enclosing, &c.	7	0 0
	37	0 0
Balance in favour of grazing	£16	12 0

It is necessary to state, in connexion with this plantation, that, being destined ulti-

mately to form a hardwood one, which is longer of becoming profitable than pine or fir plantations are, the time for shewing its profit or loss has not yet fully arrived.

VIII. Is a mixed pine and fir plantation, fifty years planted, comprising about 40 acres. Four thousand trees per acre were originally planted, and the exposure being considerable, the trees were allowed to grow up, with a view to shelter each other, till they were between 20 and 30 feet high, with stems scarcely 4 inches diameter at base. The least exposed parts were thinned before much injury was sustained by the trees; but the exposed parts were not thinned till the vitality of the side branches had been nearly destroyed to fully two-thirds of the height of the trees.

The ultimate effects of the protracted thinning has proved so far injurious as to render the value of the plantation only nominal. In proof of this, other plantations of similar age, but thinned in due time, were yielding trees sufficient to make railway sleepers, while this one was only producing prop-wood; or while the properly thinned plantations were yielding trees worth from 5s. to 7s. 6d. each, this was yielding them worth only so many pence.

The average number of trees per acre is 450, and are worth, according to market price, 6d. per tree upon an average = per acre £11 5 0

Rent of ground for fifty years, at 5s. per acre . £12 10 0

Expense of plants, planting, enclosing, &c. 3 10 0

16 0 0

Balance in favour of grazing £4 15 0

In this case, the true and only cause of failure was in consequence of want of timeous thinning.

Would space permit, we might cite other examples to shew how mixed plantations are less remunerative than those composed of one sort of trees only, or at least in groups, if otherwise adapted to the soil, each class by itself; but as such a statement, in order to make itself sufficiently clear and comprehensive, would necessarily be a long one, we must defer it to another opportunity.

IX. Is an oak plantation, or rather the last remnant of what constituted one of the natural forests of the country, and is preserved by its proprietor as a relic of the past. It comprises altogether only about two acres. The trees, as they stand, shew unmistakeable signs of being stock-shots. Some old records are preserved recording an extensive fall of oak, either at or contiguous to the place where those are found growing. The records state that the fall of oak took place about 200 years ago, and it is quite probable that the surmises respecting it are correct. Having examined this grove of oak with considerable care and minuteness, we conclude respecting it as follows:—To state the number of trees would lead to misapprehension, as they have not risen into single trees, but divide into several members, either at or a short distance above ground; hence the difficulty of determining whether each group should be described as one tree or several. We may however state that, except in respect of height, we do not conceive how a heavier crop of timber could grow upon the ground, the trunks being literally touching each other.

The probable quantity of timber upon an acre is 5000 feet, which, at 2s. per cubic foot, represents £500; and, as the probable growth is 200 years, the yield annually would be 50s. per acre.

The ground, for agricultural purposes, is worth about 30s. per acre, and the estimated cost of planting would be about £6 per acre.

A crop of oak would attain the highest value per acre of any description of wood, because it remains sound and continues growing probably twice as long as most other trees; but, at the same time, larch, and indeed most other trees, pay the proprietor better than oak, because of them several crops can be grown while only one of oak is produced.

XI. Is a plantation of black Italian pop-

lar, comprising about one acre. Age of trees, forty years; distance apart, 15 feet = 193 trees per acre; containing on an average 30 cubic feet = 5790 feet, which, at 8d. per foot, is = £193; the latter sum, divided by 40, gives £4, 16s. 6d. as the annual return per acre.

Comparative profitableness and advantages of planting poplar over that of grazing the ground :—

Value of crop	£193 0 0	
Rent for forty years, at 25s. per acre . . .	£50 0 0	
Expense of plants, planting, enclosing, &c. . .	8 0 0	
		58 0 0
Balance in favour of planting, minus compound interest on outlay	£135 0 0	

The prices of wood varied much more at one time than they do now; and as free trade develops and commerce increases, together with increased facilities of transport, so will the price of wood continue to equalize itself throughout the country. The annexed are the prices realized for the best descriptions of wood at the following places at the present time :—

Wood, of any description, is sold occasionally at prices considerably higher than those above quoted; because at times extra good or suitable pieces are required for certain special purposes, for which higher prices are given; but it will be found that the prices above quoted are very near the truth, and wood can either be bought or sold at them to almost any extent. The proprietor, however, must calculate upon deriving for his wood produce a sum less than that above quoted, equal to that which is required to convey it to the market.

In addition to the foregoing list of prices, there are others necessary to be known, in order to determine the produce of woods—such, for example, as pit-props, spar-wood, and wood occasionally sold by the ton.

As Newcastle, Glasgow, and Paisley are amongst the principal markets for these, we annex the present current prices.

Common Scots pine pit-props delivered in Newcastle market, 3s. per 72 lineal feet (or what is termed a dozen props), implying that there are either twelve of them 6 feet in length, or a greater number of them in shorter lengths.

Crown-props, which should stand 5 inches in diameter when dressed, that is, after a chip is taken off each of the four sides, realize

Species of Tree.	Aberdeen.	Edinburgh.	Glasgow.	Dumfries.	Inverness.	Perth.
	s. d. *s. d.*	*s. d.* *s. d.*	*s. d.* *s. d.*	*s. d.* *s. d.*	*s. d.* *s. d.*	*s. d.* *s. d.*
Ash	1 6 to 2 6	1 6 to 0 8	1 0 to 1 8	1 3 to 1 8	1 10 to 2 0	1 3 to 2 6
Alder	0 10 ,, 1 3	0 9 ,, 1 0	0 8 ,, 0 9	0 8 ,, 0 10	0 6 ,, 0 7	0 9 ,, 1 3
Beech	0 10 ,, 1 0	0 8 ,, 1 0	0 8 ,, 0 10	0 7 ,, 0 9	0 7 ,, 0 10	0 10 ,, 1 0
Birch	0 8 ,, 0 10	0 9 ,, 1 0	0 8 ,, 0 9	0 8 ,, 0 10	0 6 ,, 1 0	0 9 ,, 1 3
Elm	1 6 ,, 2 6	1 3 ,, 1 8	1 0 ,, 1 8	1 4 ,, 1 6	1 9 ,, 2 0	1 6 ,, 2 0
Horse Chestnut	0 9 ,, 0 10	0 8 ,, 0 9	0 8 ,, 0 9	0 6 ,, 0 7	0 8 ,, 0 10	0 8 ,, 0 9
Hornbeam	1 0 ,, 3 0	1 0 ,, 3 0	0 10 ,, 1 6	1 4 ,, 1 6	1 9 ,, 2 0	1 6 ,, 2 0
Evergreen Oak	1 6 ,, 6 0	2 0 ,, 5 0	3 0 ,, 6 0	1 0 ,, 4 0	2 6 ,, 5 0	2 0 ,, 4 0
Larch	1 3 ,, 1 8	1 4 ,, 1 8	1 2 ,, 1 4	1 0 ,, 1 2	1 0 ,, 1 2	1 0 ,, 1 6
Lime	0 10 ,, 1 6	0 10 ,, 1 3	0 9 ,, 1 3	0 8 ,, 0 10	0 6 ,, 1 3	0 10 ,, 1 3
Laburnum	1 0 ,, 2 0	1 6 ,, 2 6	1 6 ,, 2 3	1 0 ,, 2 0	1 0 ,, 1 6	1 0 ,, 2 6
Oak	1 6 ,, 2 3	1 8 ,, 2 0	1 4 ,, 1 8	1 6 ,, 2 3	1 8 ,, 2 0	1 8 ,, 2 3
Poplar	0 10 ,, 1 3	0 10 ,, 1 3	0 8 ,, 1 0	0 8 ,, 0 10	0 6 ,, 1 3	0 9 ,, 1 3
Scots Pine	0 8 ,, 1 0	0 9 ,, 1 0	0 8 ,, 0 10	0 9 ,, 0 10	0 6 ,, 0 7	0 8 ,, 0 10
Spruce	0 8 ,, 0 10	0 9 ,, 1 0	0 8 ,, 0 10	0 9 ,, 0 10	0 6 ,, 0 7	0 8 ,, 0 10
Sycamore	1 0 ,, 3 6	2 0 ,, 3 6	1 6 ,, 3 6	1 0 ,, 2 0	1 6 ,, 3 0	1 6 ,, 3 6
Sweet Chestnut	1 0 ,, 2 0	1 0 ,, 2 6	1 6 ,, 1 10	1 0 ,, 1 6	1 2 ,, 1 8	1 6 ,, 2 0
Willow	0 10 ,, 1 3	0 10 ,, 1 0	0 8 ,, 1 0	0 8 ,, 0 10	0 7 ,, 1 3	0 9 ,, 1 3

Larch 1-inch deals, 16s. per 100 superficial feet.

in the same market, 5s. 3d. per dozen (72 lineal feet).

Spar-wood, which comprises trees between pit-props and timber size, from 6 to 8 inches diameter at 12 feet from the ground, realizes in Newcastle market, 10s. 6d. per 100 lineal feet.

Spruce and silver fir are sold at the same prices as Scots pine, but larch is from 1s. 4d. to 1s. 5d. dearer.

					Each.
Scots pine sleepers,	9 feet long	10 × 5,	realizes	2s.	6d.
Spruce	do.	do.	do.	2s.	6d.
Silver fir	do.	do.	do.	2s.	6d.
Larch	do.	do.	do.	3s.	3d.

Small scantlings for mining purposes, of Scots pine, spruce, or silver fir, 5 inches by 2, are sold at from 11s. to 12s. per 100 lineal feet.

Larch of the same dimensions, and used for a similar purpose, realizes from 14s. to 15s. per 100 lineal feet.

Scots pine, spruce, and silver fir, ½-inch staves, realize from 34s. to 36s. per 1000 superficial feet.

Larch staves of the same thickness, realize from 68s. to 74s. per 1000 superficial feet.

Scots pine 1-inch deals, 12s. 6d. per 100 superficial feet.

Spruce 1-inch deals, 12s. 6d. per 100 superficial feet.

Lath (S. pine), per 1000 superficial feet, 6s.

Paling rails, 3½ × ⅞-inch thick, are sold at 1d. per lineal yard throughout Scotland generally.

Larch posts, 3½ inches by 3½, of best quality of wood, are generally sold at about 1d. per lineal foot; and round posts, from 3 to 4 inches in diameter at small end, are usually sold at a quarter less, in consideration of the wood being of inferior quality.

Having cited several examples of the value and productiveness of wood, in the form and state of plantation, and also the prices it commands in the manufactured state in the principal markets, we shall next endeavour to shew the general leading purposes to which it is applied.

Scots pine wood being the most common, plentiful, and extensively used, it is difficult to say in what particular branch of business or manner of consumpt the greatest part of it is consumed, especially as the trade in wood is so varied and fluctuating. The chief demand, however, for Scots pine timber during the past ten or fifteen years, has been for railway sleepers, for which purpose there has always been an open market and ready demand, although the prices given for railway sleepers only allows to the grower from 5d. to 6d. per cubic foot for his rough wood. Next to sleepers, the great demand and open market is for staves, and wood for packing boxes. Wood of this description realizes to the proprietor only from 2½d. to 3d. per cubic foot; but the wood used for this purpose, being generally below timber size, is not sold by the cubic foot, but by lineal measure, or so much per dozen; this will appear obvious from the circumstance that only 35s. is derived per 1000 superficial feet for ½-inch staves in the Glasgow and Newcastle markets, which requires 2¼ cubic feet of wood, 12 feet long, and 6 inches on the side of the square (minus the bark), to produce 1000 feet of staves ½-inch thick, or 58½ cubic feet is required to produce the same quantity of staves of the same thickness, when the tree is 8 inches on the side of the square instead of 6. In order, therefore, to manufacture wood into staves, to the greatest advantage, it must be selected of the size most suitable for the purpose.

The wood consumed for package boxes and barrels of various descriptions in Newcastle alone, for exporting soda and other dry goods to India and the colonies, is great almost beyond comprehension. Except native Highland Scotch pine, and that of some of the oldest plantations in other parts of the country, and situated upon dry ground and high exposure, little of it is used in important or substantial buildings, owing to the common objection of its liability to worm-eat; but it is fully admitted that the best quality of Scots pine, as is testified by its duration and partial preservation in buildings two centuries old, is equal, if not superior, to wood imported from foreign countries; and it is also to be regretted that many more of our bleak heath-covered mountains are not clothed and enriched with Scots pine, which, although

er growth than upon good soil and
ıltitudes, is of better quality, and would
ıe to grow for a century or more, when
ıore favoured brethren have succumbed
ordeal of disease and death. Upon
:states, great quantities of Scots pine
s used for various descriptions of fences,
ıkments, and other works, and it is now
after a lengthened trial, that by sub-
ʒ it to an embalming process, by steep-
in the oil of tar or creosote, the very
: and most worthless descriptions of it
ndered almost as durable as larch, at a
ıratively trifling expense.

:h is at present, of all others of the coni-
tribe, most esteemed as a serviceable
ɔr supplying wood for out-door work;
ıe purposes to which it is applied are
t innumerable, and rapidly increasing.
.ilway sleepers it is highly esteemed, and
so in great demand for fencing purposes.
ut-door work, it is considered the most
le of all descriptions of wood. The
ıened period that some larch posts have
is quite surprising, some of which are
n to the writer to have stood nearly forty
than which there can be no better proof
durability. There are few purposes to
. the other pines may be applied to which
may not be applied with greater advan-

The only well-known and lamented
: of the larch is its liability to warp and
which is principally due to its peculiar
ıanical structure. Trees grown in an ex-
. site are much more liable to twist than
grown in a sheltered situation; and one
: best proofs of a tree being exempt from
ng is that of the pith being directly in
:ntre of the tree.

r ship and boat-building, larch has for
/ a century past been very generally used,
:or this purpose it has given much
ıction.

e knees used for supporting the decks,
: require to be of the best and strongest
ıber, are most esteemed when of larch.
ɔlanking of the decks of first-class vessels
ɔ frequently done of larch.

k is most extensively used for ship and
ɔuilding of all other descriptions of timber, and none is found to answer so well; but hitherto its application has been less universal on two considerations—the first, is its liability to contract dry-rot in certain parts of the vessel; the second, is that of iron being used instead of wood; but notwithstanding all this, there is a large consumpt of oak in the building of vessels, and the largest quantity and best description finds its way to the dock-yards.

Much furniture is made from oak; and the fittings and general wood-work of most of the principal buildings of the country are either wholly or partly of oak, some of which have been submitted to a certain steeping process, thereby changing its colour.

Agricultural implements, where much strength is required, are less or more constructed of it, especially such as wheels, shafts, and the principal frame-work of carts. Its sap wood is extensively used for plaster-lath; its bark, in the preparation of leather; its oak galls, in the manufacture of ink; its saw-dust, in the curing of fish; its acorns, for the feeding of swine; and its leaves, for litter and manure.

Birch is always in good demand, and realizes prices which pay the proprietor handsomely, especially if he has sufficient quantity of it in one district to warrant the setting up of a manufactory in its vicinity, for converting it into bobbins, reels, broom-heads, and similar ware for the market. Large quantities of it are transported to Glasgow and Paisley, where there is always an open and ready market, at prices varying from 18s. to 24s. per ton. Birch of large size and superior quality, fit for furniture-making, realizes, according to quality and peculiar grain of the wood, from 2s. 6d. to 5s. per cubic foot. The small branches or spray of the birch is in demand for broom-making, which are used extensively in stables, distilleries, and breweries; for street sweeping, garden walks, and carriage roads. Sixpence per faggot (a bundle 4 feet in girth) is the common price, delivered in town. Birch bark is increasing in demand since larch bark became scarce, and the prices obtained for it are from 50s. to 60s. per ton.

Willow is eagerly sought after by m

wrights and machine-makers, for certain parts of whose work it is admirably adapted, being light, elastic, and durable for such purposes; from 1s. 6d. to 2s. 6d. per cubic foot is obtained for clean cuts.

Poplar—for this description of wood, its present chief demand is for brake-block for railway purposes, for which 1s. 6d. to 2s. per cubic foot is given. It is also in demand as boards for bedroom floors, its having a dead sound, and being almost incombustible, together with its great durability, are its chief recommendations for this purpose. Lining for stone; cutting boards for shoemakers, saddlers, &c.; palisade palings, plaster lath, and deals for weather boarding, together with its extensive use in the manufactory of hats and hat boxes, are among the principal uses for which it is employed; but it would doubtless be used for others, such as the manufactory of paper (for which it is well adapted), but for its scarcity. Its bark contains tanning about equal to birch, and its copse wood pays handsomely in the neigbourhood of potteries, where its use is for the manufactory of crates.

Lime tree is used for purposes similar to poplar and willow, but also for purposes for which they are unsuitable, such as wood engraving and turnery. Its inner bark forms the fibre of our mats imported from Russia, but which might as well be manufactured at home, as it differs in no important respect from that procured from abroad. Its charcoal, which is used in the manufacture of wire and iron, is considered the best of all sorts.

Alder, like poplar, is in request for brake-blocks, and is also extensively used in the manufacture of clogs and pattens, for which purposes it is well adapted. It is also peeled and made into charcoal for the manufacture of gunpowder, for which purpose it is superior to any other description of wood. It is also extensively used in the manufacture of toys, and certain parts of machinery; and its bark is also valuable for tanning purposes, for which it realizes a price similar to birch.

Sweet chestnut is a valuable wood for many purposes. It is equal to oak, and for some purposes even superior to it—such as gate pillars, fencing posts, &c.; it stands equally as long, and in case of young trees of either species, that of the sweet chestnut stands longest. It makes excellent lath, and splits readily for that purpose, if clean grown. When introduced into ships by misapprehension, instead of oak, which it much resembles, it has proved equally durable. As timber in buildings, it stands better than oak, being less liable to worm eat. It has been found, on taking down old buildings constructed partly of sweet chestnut and partly of oak, that the former was of better preservation than the latter. Its bark also contains a considerable amount of tannin; and as a fruit-bearing tree, none in the forest is equal to it, or pays so well, especially in England, where a large tree will produce over half-a-bushel of clean nuts, worth about 4s. in the London market.

Sycamore—for certain description of the wood higher prices are given than for any other of British produce. As much as 5s. per cubic foot is given for it, if suitable for making musical instruments, and even 3s. 6d. per foot is realized for certain pieces for turnery ware. Bobbins, reels, and other ware, for manufactory purposes, is made from the smallest wood, so that none of it is either wasted or unsaleable; hence, from these considerations, there is much inducement for planting sycamore.

Ash.—The ash has been termed the poor man's tree, probably from the circumstance that at one time his whole stock of agricultural implements were made from it, which no individual tree would so well make. It combines strength of fibre with elasticity, in a remarkable degree; and a great advantage is that the wood of the ash, from that of the sapling a few years old to the monarch of a century, is alike valuable and useful. For making handles to tools, where strength, lightness, and elasticity combined, are required, no wood is so valuable. Coach-builders use it extensively, and likewise mill-wrights, wheelwrights, carpenters, cabinetmakers, coopers, joiners, ship-builders, and tool manufacturers. Some parts of the ash are beautifully and richly grained, and are held in high estimation by cabinetmakers, and fancy prices

n for such choice pieces. For fuel, no wood better adapted, and it burns well when green as when seasoned.

laburnum, though scarcely entitled to e of a forest tree, is yet of no small nce in an economic point of view. ious articles of turnery, no wood of uitable—such as handles, knobs is , egg cups, and fancy ware—for all ticles it possesses peculiar advantages, rms will scarcely penetrate it. As an e of this, we saw a few days ago a g-wheel, known to be two hundred ld, which was as free from worm-eat as l been made yesterday. The sap wood owever, was so far gone as to crumble touch. Pulley-blocks, rollers, &c., hardness and smoothness form the al requirements, for which no wood itable; and it also contains an oil which reatly to preserve the wood.

hornbeam is an important, but unas- ; tree, and seldom allowed the oppor- of proving what it might become under ible circumstances; but enough is of it to give it a high recommendation of the finest and most elegant of fur- producers. In a nobleman's house, to the writer, there is furniture made he hornbeam equal in elegance and to any in that house. Its waviness ses that of the birch, its colour equals aple, and its lustre that of the satin-

From what we have seen of the am, and furniture produced from it, l satisfied that it is well entitled to ortant place in the woodlands.

evergreen oak, from its difficulty pense of rearing, cannot be recom- d for general planting. Yet, on it of its beauty at all seasons of the t is not only entitled to the care and on demanded, but, considering its un- d beauty in articles of furniture, it es the first attention for that purpose

The finest furniture, without excep- e have ever seen, is that made from een oak, and to those who have not e opportunity of seeing such a pleasing we would recommend them to embrace the opportunity of doing so, when opportunity is afforded.

The holly is a valuable wood for turnery purposes; and from its pure whiteness, which contrasts well with wood of darker colour, commends itself on this account for various articles of furniture.

There is yet another description of wood (coppice) which demands a passing notice, as it contributes in some degree, less or more, to make woodlands profitable; but want of space forbids us entering upon it here. Neither does it fall (properly) to be considered under this head.

There is yet one important article of wood produce almost entirely wasted or unemployed, at least so far as profit is considered, viz., sawdust. In many districts, sawdust is found to be a cumbrous nuisance, neither fit to be put in the river nor permitted upon the land, as it is supposed, in the one case, to kill the fish, and in the other, certified to corrupt and poison the soil, and destroy the crops. Having made some experiments with sawdust, with a view of turning it to profitable account, we shall relate the results, and give the reader the benefit of our experience of the subject, in order that he may be able to perfect that which we have only begun.

Sawdust, possessing as it does, much turpentine, proves hurtful to the land as a manure, and in order to purify it of its injurious properties, we dry it and put it into heaps, with a few dry chips or other combustible materials in the centre. When made up into conical heaps like potato stores, it is then set fire to from the top, allowing it to burn downwards till the whole mass is charred, by putting it through the identical process wood is submitted to for making charcoal for ordinary purposes. This being done, which can be accomplished at a small amount of labour or cost, the charred sawdust is then put under cover, from whence it is taken out as opportunity affords, and put into barrels or tanks, and to it is applied urine from the yard, or it may be from the common urinals. The charcoal not only absorbs, but holds in solution, every particle of the urine, and these attract from the atmo-

sphere certain other gases, till the whole mass contains fertilizing properties nearly equal to nitre; and, so far as experiments have gone, no manure of equal value can be purchased at the same price that this is produced at.

The leaves of the forest may also be turned to profitable account, instead of littering the woods, choking up drains, and soiling roads, drives, and walks: they may be converted into manure at only the expense of collecting.

SUMMARY.

1st, The stem or trunk of the tree is used for building houses and constructing ships, making implements of husbandry and machines, producing materials for the making and working of railways, &c.

2d, The branches, amongst other purposes, are used for fuel to warm the body, cook the food, and render hearts and homes comfortable and cheerful.

3d, Small wood is used for mining purposes to support the roofs of coal pits, fence our fields, and protect our crops.

4th, Plantations shelter the country, break the fury of the wind, and enable stock to live and thrive, which, but for plantations, could scarcely exist.

5th, Roots, chips, bark, sawdust, and leaves, are converted into manure, for producing crops by which the million is fed.

6th, Trees, unlike flowers or fruits of the garden or field, require comparatively little attention beyond planting and thinning, will go on growing while men are sleeping, if only, in the first place, rightly planted, and in the second place, receive due and proper room to grow.

7th, Trees have a period of ripeness or maturity like most other products of the soil; and there are also times when advantageous sales can be effected; and otherwise, all of which times and opportunities require to be watched and embraced.

FELLING TREES.

BY WILLIAM GILCHRIST, CLUNY CASTLE, ABERDEEN.

AT no period in the history of Arboriculture could the above subject have been more appropriately brought before the members of the Scottish Arboricultural Society than the present, as we are living in an age when the great question that affects all investments is, what profits will they realize? and at what period may these profits be most profitably realized? Science and art, in the multiplicity of their inventions, are brought to the aid of the manufacturer, so that his goods may be brought to the market in the shortest possible period.

Agriculture, through the same causes, has within a very short period undergone almost a magical change, her implements and machinery have been revolutionized, and steam has been brought to the aid of, and threatens to supersede, horse-power in the cultivation of the land.

In these improvements Arboriculture has also shared, by the necessity that, through science, has been shewn for thinning and draining plantations, but more particularly by the chemical preparations that from time to time have been introduced for the preservation of wood. These chemical appliances being still on their trial, it would be premature to speak particularly of any of them; but there is reason to believe that when they come to be better understood and applied, the value of "home" grown timber may be enhanced.

In considering this subject, and before enumerating the various sorts of timber trees usually grown in Scotland for profit, it will be well to take a general view of what are the

erations that ought to be taken into
t in deciding at what time a crop of
an be most profitably reaped, and also
things that ought to be taken into ac-
in calculating the profit of a crop of

a general rule, wood, like any other
hould not be reaped until it has reached
ity, or attained to full size; nearly all
mber trees require many years, while
of the varieties require upwards of a
y to arrive at maturity. But granted
ome sorts of trees take upwards of a
y to arrive at maturity, a question
s to be, is it not possible to realize the
of these trees more profitably before
ome to maturity? With some sorts of
in certain districts, it is, and with others
ıot, as a great deal depends upon local
nstances, and the demand that, for the
being, exists for the various sorts of
r. The demand or market constitutes
ement in determining at what time a
of wood can be most profitably reaped.
nstance, in some parts of the country,
especially in mining districts, fir trees
ıle for prop-wood can be grown and
at from twenty-five to thirty-five years
nd at that age realize greater profits than
would do if allowed to grow to double
ge; whereas in other parts of the country,
the situation may be far from mining
cts, and from 20 to 30 miles from
port, the same class of wood would
y repay the expense of cutting and con-
g it to the market; so thus in the one
ion wood *can* be grown and felled pro-
y before reaching maturity, in the other
ıst have reached such a size as will fit
being manufactured in the neighbour-
, and then sent to the market in a
ıfactured state. Again, in some districts
ngland, copsewood grown for hop-poles,
wood, fuel, &c., is one of the most pro-
e wood crops that can be produced,
in the greater part of Scotland the
ıs from crops of that kind are very
siderable.

e past management of wood must also
ken into consideration in deciding as to its future. It is a common thing to see a plantation that has been neglected, and the trees allowed to get overdrawn until they have come to be "mere spars." Instances of plantations could be given where, at from twenty to thirty years old, the trees are so much overdrawn that all hope of their becoming timber trees is gone. Therefore, although they cannot be said to have reached maturity, they are only occupying the ground without adding to their value. To say of such a crop that it should be allowed to stand until it was sixty, seventy, or perhaps one hundred years old, would only be allowing a crop to remain on the ground for thirty or forty years after it could have been most profitably reaped; for, be it remembered, that a neglected crop of trees, after they come to a certain state, improve very little in value; whereas woods that are grown in a suitable situation as to soil, and have been well managed in their earlier stages, at thirty or forty years of age begin to add materially to their value each successive year. The profits of such trees cannot be fully realized until they have come to maturity.

In high-lying and exposed situations, timber trees require more time to come to maturity, but they produce better quality of timber than is produced in low-lying and sheltered plantations. It may be safely said that trees that would take a hundred years to come to maturity in high-lying districts would require not more than sixty or seventy years in low lying and sheltered districts; yet the quantity of wood in the latter would be more than in the former.

The situation which a plantation occupies is a very important consideration in deciding when the trees can be most profitably felled; but with the generality of wood managers it is a consideration that is often overlooked. For instance, a plantation may be growing in a situation where the shelter provided by the trees to the lands adjoining is of more value than the mere price of the trees. The same consideration applies to trees grown in belts or hedgerows throughout the cultivated or pastured districts. Therefore it is unfair to expect the timber produce of these planta-

tions or belts to be a profitable investment. They are formed and grown for a double purpose, and the one purpose should yield its quota of profits as well as the other.

In extensive woodland districts, the actual value of the wood may be all that requires to be taken into account, and in these woodland districts fair profits are generally realized; but it must be borne in mind that the value of ground in these districts is very moderate, consequently very little is charged against the plantations for annual rent. The soil is also often better suited for the growth of timber trees of the fir tribe than it is in the districts that are more cultivated. Plantations are to be found throughout the greater part of the cultivated districts of England and Scotland, varying in extent from 1 to perhaps 100 acres, and consisting of different varieties of trees; and if their past histories could be told, the objects for which they were planted, and the purposes for which they have been used, would be still more various. Some may have been formed for ornament, some for shelter, others for game preserves or fox-covers; a still greater number may have been formed to cover irreclaimable land, or to please some individual fancy; while the minor number have been formed for the actual profits to be derived from the wood, or as profitable investments. Whatever may have been the object in planting, I think I am warranted in saying that the greater number of them have been used for other purposes than the cultivation of timber trees. Most plantations are used to afford pleasure to the proprietors or their friends at one time or other.

If it has been found that the shelter produced by trees adds an appreciable value to the lands adjoining, I would suggest that, in calculating the value of a crop of wood, the said 10 or 15 per cent. should be placed to the credit of the plantation; and the same rule ought to apply to game rents and such like pleasures. If this is not granted as to game rents, &c., the wood manager ought to be allowed to let the plantations for grazing as soon as the trees are beyond the danger of being injured by sheep. By doing this, from 2s. 6d. to 10s. per acre can be realized. That, along with the per-centage chargeable for the shelter produced to the adjoining lands, is no mean consideration in assisting to pay the rental that is yearly chargeable against plantation ground. Some of these considerations are the more necessary, as the wood manager, owing to restrictions being put upon him for the sake of game, &c., is often obliged to do the necessary wood-work during the winter season, and at a great disadvantage. It is often said that wood crops do not pay; but if all these considerations and details at which we have only hinted were taken into account in calculating the returns, I feel assured that wood crops would come to be regarded as a more remunerative investment.

We have already said that some varieties of trees come sooner to maturity, and can be profitably felled at an earlier age than others. This is particularly the case with some of the fir tribe, which, for profitable culture, are the sorts best adapted for the soils and situations of Scotland. The larch, which has been the most remunerative tree ever introduced, will yield fair profits at twenty-five to thirty years old for fencing purposes and prop-wood. At about forty-five years it is good spar-wood, worth from 3s. to 4s. per tree in some districts. If it is growing freely, it should not be cut at forty-five or fifty years old, as it is only after this period that its largest annual growths are made, these sometimes adding from 1 to 2 cubic feet in one season. From sixty to one hundred years, according to soil and situation, I consider to be the most profitable time to reap the value of a crop of larch. It has been estimated that the profits of a crop of larch at that age may realize as high as £500 per acre, and sometimes even more; and I have no doubt but that exceptional cases may be got bearing out these statements. But I feel assured that, taking a general average of the larch plantations in Scotland at the present day, the price per acre at sixty years old would not exceed £150. This is a point that cannot be decided except by carefully prepared statistics.

This is well worthy of being considered by the Scottish Arboricultural Society.

Another objectionable point in some of the statements that have been made regarding larch is the price per cubic foot (generally from 1s. to 1s. 6d.) on which the statements or calculations have been based, the prices stated being generally as much as can be got for it when laid down at a seaport; whereas the correct estimate should be the price or value of the wood as it stands in the plantation; or if it is cut, manufactured, or conveyed in any way, it should be stated, and the cost of doing so deducted from the price received.

The finest larch trees are often grown as nurses among hardwood, principally oak, in situations composed of deep alluvial soil, dry and open, with a gravelly subsoil and sheltered situation. Really good larch are seldom got when grown amongst Scots pine. Thin moor soil, with a hard bottom, or poor and stiff clay, with a wet bottom, are soils where the larch will not grow profitably.

The Scots fir may be felled and used for drop-wood, spar-wood, and timber trees: at sixty years old it has often to be divided into these classes. The profits realized for a crop of Scots fir are not so high as the larch; but it is more generally grown in the north of Scotland, and is a safer crop than the larch. They are often grown together, but neither of them do so well as when grown amongst hardwood, or by themselves in masses. The wood, when far from a market, is sold at a very low price. As an instance, thinnings from a plantation forty-eight years old have been lately sold in lots, by public auction, at the rate of one farthing per lineal foot, or, on an average, about 6d. per tree. Another plantation, rather nearer the market was sold at 3s. 3d. per tree at sixty years old, and about 230 trees on the acre. Another plantation, two-thirds larch and one-third Scots fir, seventy years old, sold at £40 per acre. Near to the market, I have sold Scots fir at 1s. 1d. per foot; while at 18 miles from a seaport, 5d. per foot is all that can be got for wood of equal quality.

The Scots fir succeeds in thin moorland and light sandy soils better than any other sort of tree, and on these soils it is really a profitable crop. Where the soil and situation are suitable, it is generally most profitable to grow it to timber size.

The chemical appliances at which we hinted in the opening part of this paper are already working changes in the uses to which Scots fir may be applied. It is now extensively used for railway sleepers, and when chemically prepared is little inferior to the larch for that purpose.

The spruce and silver firs can seldom be felled profitably until they have come to be timber trees. Of course, in situations where they are affected with heart-rot, or any other disease that would prevent their becoming timber trees, the sooner they are felled after the disease has shewn itself the larger will be the profits; and the same rule applies to all timber trees grown for profit.

In damp mossy soils the spruce grows to larger dimensions, and is more profitable than any other tree, with perhaps the exception of the poplars and Huntingdon willow; but in exposed situations, with hard, retentive, clayey soils, it will not grow to be profitable at any age.

The silver fir has not been so extensively grown as the former, but in some situations it attains a greater size in a given time; as a profitable investment, few trees give greater promise. Like the Scots fir, it is being introduced as sleeper-wood.

The ash may be profitably felled at all stages of its growth; but the highest prices are got for it when at a size fit for handle-wood, &c., or for full-grown timber trees of large dimensions; the intermediate size generally being from 4d. to 6d. per cubic foot cheaper than the two former.

The oak can seldom be felled profitably (unless for copsewood) before it is 120 or 150 years old, or at least until its heart-wood is perfected, as the wood, although of a good size—if the heart-wood is not matured—is generally sold from 1s. to 1s. 3d. less per cubic foot than the matured wood, and the difference is even sometimes greater. On the same estate, I have sold oak 120 years old at

3s. 6d. per foot, and at seventy years old at 1s. 6d. per foot; the situations where the trees grew being similar. The same remarks apply to the sweet chestnut.

The sycamore, Norway maple, and birch, are saleable when about thirty years old, being used for the purposes of turnery, &c.; but profitable returns are not got from them until they have come to timber size, and the larger the scantling to which they are grown, the higher will be the price per cubic foot.

Beech and English and Scotch elm, when young, and of a small size, are only sold as *ton* wood; and where the object of planting is to get profitable returns, they should never be planted except in soils and situations that will grow them to full size.

Horse chestnut and lime trees are generally grown more for ornament than for profit; but both can be grown profitably in good soil and sheltered situations, as high prices are got for the wood when of a large size.

The poplars and willows are all very fast growers, and their wood is in great demand at all stages of their growth. When well grown, their wood may be profitably sold from thirty-five to seventy years of age; at about the latter period, the highest profits for them can be realized.

The alder being generally grown on wet swampy ground, and used for turnery purposes, charring, &c., it may be most profitably felled at forty or fifty years old; when once established in the ground, it does not require to be planted again though cut down, as it springs readily from the root, and makes excellent copsewood.

The annexed tables will more fully illustrate our opinions on this subject; but as these are only compiled from individual experience, they must not be taken as a full representation of the timber trees grown in the several districts of Scotland; in fact, no individual experience can have much weight on the subject. I would, therefore, suggest to the Committee of the Scottish Arboricultural Society that blank copies of these or similar tables should be sent to all the members of the Society, and let each member fill up the table, so far as his experience goes, and then the Publishing Committee might have them analyzed and published with the Transactions.

Full returns and information on this important subject would then be had, and the subject should not be confined to Scotland, but should comprehend England and Ireland, as members of the Society are to be found in all parts of the kingdom.

Since writing the above, I have learned that returns as to the price of timber were issued by the Scottish Arboricultural Society in the first volume of their Transactions; but as these cannot now be had, they might be again taken up with great advantage to the younger members of the Society.

TABLE A.

NAME OF TREE.	Wood growing in a Mining district, or within 8 miles of such.				Wood grown within 12 miles of a Seaport.				Wood grown at 12 miles and upwards from a Seaport.				REMARKS.
	25 years.	40 years.	60 years.	100 years and upwards.	25 years.	40 years.	60 years.	100 years and upwards.	25 years.	40 years.	60 years.	100 years and upwards.	
	100 ft.	per ft.	per ft.	per ft.	100 ft.	per ft.	per ft.	per ft.	100 ft.	per ft.	r ft.	per ft.	
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	
SCOTS PINE	6 6	0 9	1 0	1 2	4 6	0 7	0 10	1 0	2 3	0 4	0 5	0 7	Inferior quality has been sold at 2d. per foot
LARCH	7 6	1 0	1 2	1 5	6 0	0 8	1 0	1 3	2 6	0 6	0 8	0 10	Extra quality sold as high as 2s. 3d. per foot
SPRUCE FIR	6 6	0 8	0 10	0 11	4 6	0 6	0 8	0 10	2 3	0 3	0 4	0 6	Spruce and silver fir, though used for the same purposes as the Scots pine, seldom realize the price
SILVER FIR	6 6	0 9	0 11	1 2	4 6	0 6	0 9	0 11	2 3	0 3	0 5	0 7	
	per ton				per ton				per ton				
ASH	20 0	2 0	1 4	1 6	15 0	1 8	1 4	1 6	10 0	1 8	1 4	1 6	Ash chiefly used for local purposes
		per ton				per ton				per ton			
ALDER	12 0	15 0	0 10	1 0	7 6	10 6	0 8	0 10	4 0	6 0	0 8	0 10	In the latter district alder is used by carpenters
BEECH	8 6	12 0	0 10	1 2	4 6	7 6	0 7	0 10	3 0	5 0	0 4	0 7	Extra size and quality is sometimes sold at 2s. 6d.
BIRCH	15 0	20 0	0 10	1 0	10 0	15 0	0 8	0 10	5 0	10 0	0 8	0 10	Used for turnery and carpenters; prices variable
ELM (SCOTCH)	15 0	15 0	0 10	1 9	11 6	11 6	0 7	1 3	7 0	7 0	0 4	0 11	Both varieties of the elm are much sought after for crate-wood when young
ELM (ENGLISH)	15 0	15 0	0 10	1 6	11 6	11 6	0 7	1 0	7 0	7 0	0 4	0 11	
CHESTNUT (HORSE)	6 6	14 0	0 10	1 6	5 0	12 6	0 8	1 0	3 6	8 4	0 6	0 10	Not often in the market
CHESTNUT (SWEET)	8 6	25 0	1 9	2 3	5 0	20 0	1 6	1 8	3 6	15 0	1 0	1 4	When of good quality, draws a high price
						per ft.				per ft.			
LIME	6 6	20 0	1 6	2 0	4 6	0 9	1 0	1 3	3 6	0 6	0 7	0 10	Not often in the market
MAPLE (NORWAY)	10 0	25 0	1 6	3 0	7 6	0 7	0 9	1 0	5 0	0 5	0 7	0 10	Used for the same purposes as the plane
		per ft.											
OAK	8 6	1 3	1 9	3 0	6 0	1 0	1 6	2 6	4 0	0 10	1 6	2 0	Oak has been sold at 4s. 6d. per foot
		per ton											
PLANE or SYCAMORE	10 0	30 0	2 6	3 6	7 6	0 10	1 9	2 6	5 0	0 9	1 4	2 0	Plane has been sold at 4s. 6d. per foot
	100 ft.	per ft.			100 ft.				100 ft.				
POPLAR, of Sorts	7 6	1 2	1 6	2 6	6 0	0 9	1 0	1 4	2 3	0 6	0 9	1 0	Poplars and willows are very variable in price, according to the districts and demand
WILLOWS	7 6	1 2	1 6	2 6	6 0	0 10	1 2	1 6	2 3	0 6	0 10	1 2	

TABLE B, shewing the different Ages at which Timber Trees grown in Scotland can be most profitably Felled, in different soils and situations.

NAME OF TREE.	Deep sandy loam or clay, drained and sheltered, subsoil clay.	Rich loam, rather damp subsoil, and sheltered situation.	Light loam, rocky or boulder clay, drained, situation exposed.	Thin gravelly soils, coal and lime formation, situation exposed.	Dry, gravelly, and sandy soils, dry bottom, and moderately sheltered.	Rich alluvial soil gravelly bottom, and sheltered.	Moss, drained and moderately sheltered.	Clay soils, on sides of valleys or mountain slopes.	Heath or moor soils, granitic formation.	Light open soils, on freestone and whinstone formations.	Retentive clay and wet subsoil, moderately sheltered.	Light or peaty soil, damp moorland subsoil, exposed.	REMARKS.
	Years	Years	Year	Years	Years	Years	Years	Years	Years	Years	Years	Years	
SCOTS PINE	80	100	70	50	60	100	70			60	50	50	
LARCH	70	80	60	35	...	100	...	80	50	60	50	...	The larch cannot be grown profitably on dry ground or moor soil
SPRUCE FIR	70	70	30	30	...	80	60	40	...	30	50	...	Spruce will not grow profitably if exposed
SILVER FIR	80	100	50	50	60	80	...	80	...	40	50	...	
ASH	40	40	80	40	...	100	30	40	...	40	40	...	Ash grows to an old age, but most profitable when young
ALDER	50	50	...	...	...	50	60	...	...	...	50	...	Alder grows on these soils, but other trees are more profitable
BEECH	100	100	120	120	100	120	...	100	80	100	120	...	Is only profitable when a large size
BIRCH	50	50	60	60	50	50	60	50	60	40	40	50	
ELM (SCOTCH)	120	100	100	...	...	100	...	100	...	100	80	...	Elms are most profitable when grown to a large size
ELM (ENGLISH)	120	100	80	...	...	100	...	80	...	100	80	...	
CHESTNUT (HORSE)...	120	100	...	..	...	120	...	...	...	80	100	...	
CHESTNUT (SWEET) ..	120	70	70	.	...	120	...	100	...	...	80	...	Apt to get ring-shaken in some soils
LIME	100	100	...	...	...	120	...	80	...	...	80	...	
MAPLE (NORWAY)	100	100	100	80	80	100	...	80	...	80	80	...	Grows well in exposed soils
OAK	120	120	120	120	...	150	80	120	...	80	100	30	Must be grown till the heart-wood is well formed, and as copse on moorland soil
PLANE or SYCAMORE	100	100	100	80	80	120	...	100	...	80	80	...	Grows to a large size when sheltered

The Stable.

*THE HORSE AND HOW TO TREAT HIM.**

BY MR C. W. SUTTON.

[OST of you know the great love I have for every subject connected the horse, and in fact all our domestica- nimals, which is my plea for presuming roduce this subject to-night. I will not uch upon the stable, as this paper deals with the duties connected with it. In rchitecture and management of the stable ust consider the uses for which it is red, for one that would suit the forced omewhat artificial life of the racehorse l be quite out of character for horses for al purposes. All our stables should be ructed to secure good ventilation, light, t, drainage, and facility for cleanliness; should not be damp, but possess a fairly temperature both in summer and winter.) and badly lighted and ventilated :s are the pest-houses where valuable ils soon lose life and spirit, promote a g coat, and by impairing the vital powers a susceptibility to receiv any prevail-)idemic, such as strangles and influenza, nothing of such ills as diseases of the rease, swelled legs, cracked heels, hide- l, &c.; and that there are many such s in existence now, there can be no rea- le doubt; and although a bad pavement rhaps, found more especially in the s of agricultural horses, I have seen other stables where the paving-stones rough and uneven, and the floor as full les and inequalities as some of the vements in a London street. On these retched occupants are made to stand, feet taking a bearing at all sorts of s, and unless up to their knees in any attempt to lie down is attended with torture and unrest. In some stables you will see a considerable descent or slope of the floor, so that the horse is placed in an unnatural position, his chief bearing being upon the hind-quarters, whilst forward he is compelled to stand with toe up and heel down, thus throwing a constant strain upon the back sinews of the fore-leg. Such a state of things will produce, sooner or later, serious mischief. Again, if you keep a horse only for pleasure, and do not give him sufficient regular exercise on those days when you do not use him, he will get out of condition, no matter how good a stable he may have. Therefore, although I would see all stables constructed to secure plenty of light, good ventilation, with a well-arranged system of drainage, I contend that these will ever be subservient to other matters of management, which must be attended to in order that you may have the health of your horses preserved and kept up to the standard of what we all understand as good condition, and let us all feel that our best interests are consulted by the proper observances due to vitality in every form.

GOOD ARRANGEMENTS OF STABLES.

Last week I had the opportunity of inspecting the new stables built for the London General Omnibus Company, to accommodate over 600 horses. Everything that care and judgment could do, seems to have been done to make them adapted to the purposes for which they were designed. The stables are each about 180 feet long, separated into compartments (each of which will receive about 20 horses, boarded from the manger to the eaves, above which all is open to the roof from one end of the building to

* per read before the Framlingham Farmers' Club.

the other. The buildings are of brick and tile, the ordinary span roof, not drawn or plastered, thus a free access of air would constantly pass between the tiles. The lighting and ventilation is from the top, and windows upon the south-east side, with latticed ventilation also above the doors. No draught could by any chance fall upon the heels or any part of the horses, or would any light be thrown upon their eyes. The floors are of granite paving, finished with grouting and cement, and so laid that there is no chance of the animal standing in an unnatural position, but still with just sufficient fall to allow the liquid matters to pass into the drains, which are bell-trapped, and empty themselves into a tank. The loose boxes for sick horses, are built upon the same plan as the stables, but additional ventilation is effected by means of perforated bricks, one course from the bottom. One thing especially struck me, and that was the perfect isolation of the unhealthy or diseased, from the healthy horses, by using a distinct block of buildings, separated from the main body of stabling by a wall; and the inference I drew upon reflexion was how useful and necessary was a small building upon your farms, where upon the first approach of any epizootic or infecting complaints, such as strangles or influenza, amongst your horses, you could at once completely sever them from any connexion with healthy animals.

STABLE DUTIES.

I think one of the first stable duties is for the groom or keeper to be particular to note, and at once report upon, the early or premonitory symptoms of disease, and though they be ignorant of the more intricate, yet there are symptoms which would be explained in a few words, and would be of untold service when understood. How many times has an animal, when suffering from incipient inflammation of the bowels, been urged along, though perhaps miles away from home, and roused into action, when totally unfit to move, or looked upon with apathy and indifference, when every moment lost without remedial measures was precious? The early symptoms of inflammation of the bowels are violent shiverings, legs and ears cold, body tender when touched, and the animal evidently out of sorts. Of inflammation of the lungs, breathing laboured, standing with out-stretched legs, head and ears drooping, coat staring, legs and body cold, &c., &c. Of inflammation of the kidneys, looking at the loins, head depressed, back arched, hind legs straggling, crouching under pressure applied to the loins, &c., &c. Of worms, rough, staring, unthrifty coat, craving appetite, slimy dung, &c., &c. I say how valuable is that servant who is able to notice, with a quick eye, any departure from the routine of health, and it is quite within the power of every owner of horses to give the necessary information. Gentlemen will do well to have a constant eye upon the legs and feet of their horses, that they may be left clean and dry, and this more especially during the winter months. This is a duty upon which I would insist, and in which so many are deficient; consequently, should a horse be round and fleshy-legged, a little coarsely bred, or naturally disposed to grease, a few days of neglect may render him an excellent patient to the veterinary surgeon. I would never have a horse's legs washed, or go into water, without they were properly dried, and the circulation promoted afterwards by rubbing. I would rather see the legs left dirty until dry, and the dirt brushed out, than allow them to go into water without being afterwards properly attended to. Just a word on the abuse of the curry-comb, which is very useful in its place for removing scurf, and keeping the brushes right, but should never be used with one-quarter the zeal and energy which too often accompanies its application; such to a horse with a tender skin, or upon one suffering from eczema, surfeit, or kindred diseases, is positive torture, and should be at once forbidden, and neither curry-comb nor hard brush should be used when a horse is shedding his coat.

FEEDING AND FOOD.

The stable duties on feeding and food may not be out of place here. Musty hay may be detected by its smell, colour, and mouldy

nce, which, under the microscope, is l as a fungus growth. This is the f mischief—nothing you can give your :o eat is so unwholesome as this, and :ural instinct of any (except a gross leads him to refuse it, until driven it by hunger. Some consider salt a racting medium, and use it accordingly edy this evil, but only to find they are en, and to learn from dearly-bought ence that mouldy hay is unwholesome, rill leave ill effects upon the organs of ation sooner or later; and rest assured ie consumption of it is false economy, roves a poison to the horse, and not a slow one either. Oats should never be new when the March winds have the last year's crop they may be used, ven then they are too new for horses ming large quantities; but for horses eneral purposes they do not hurt after g been kept that time. The reason I it like new oats is, because they are intible, and derange the kidneys and ls. The horse eating them has no firm- of flesh, sweats immensely, and often a ty eruption, which shews itself in the of no end of little scabs matting the

Bruising oats is always advantageous, iot to the same extent—they should be ly crushed, but not ground, by which gastric juice will readily act upon starchy kernel, and will be more surely opriated to the nourishment of the ani- by a process of perfect digestion. Beans a very stimulating food for the horse, when given in too great abundance, er him more susceptible to inflammatory ks; they contain more gluten than oats, are better calculated to supply the wear- ear of the muscles in very hard work, are therefore often given by cab and ibus proprietors, as well as for agricul- horses, as they are found cheaper than and for their muscle-making properties are the right thing to be used. But ough this may be the custom it should be carried out blindly, for the duty will irst to consider the constitutional ten- ies of the animal or animals to whom they are given. Thus, I should never give them to horses whose feet and legs are inclined to inflame, or if affected with thick or broken wind. To washy light-bodied horses, beans are very serviceable, enabling them to stand work better, and although when given without judgment may do harm, will still remain a valuable food. A few words on chaff before I leave the subject of food, for since the introduction of steam chaff-cutters it is the custom of some gentlemen to have large heaps of chaff cut at one time. To this the horsekeeper or groom helps himself, until, as it approaches the bottom, a large proportion is made up of very finely cut and powdered lamina or leaf blade, and other matter, which has settled in the form of dust. Now, I have seen the ill effects of this so often, producing constipation, or stoppage, as it is commonly called, that I think it wise to draw your attention to it here. The first symptoms noticed are the intestinal secretions diminished or arrested, accompanied with colicky pains (but not like colic, for there is no intermission of pain). If these symptoms do not yield to the action of purgatives, soap and water clyster, and hot fomentations to the belly, we may reasonably suspect the presence of dust ball or some other obstruction, which is often nothing more or less than a quantity of this chaffy dust which has accumulated from day to day, and becoming firmly fixed into some of the narrower parts of the larger intestines produces the obstruction, and but too often fatal inflammation. Now I might tell you the precise treatment necessary under the circumstances, but prefer to suggest in this paper merely the preventative, which is, to have the chaff always used from the top of the heap, and as it comes to the bottom, have it carefully freed from this dust by sifting, or adopt the Cambridgeshire method, which is, to cover the floor 1 foot thick with cut chaff, upon this lay, in heaps, say 6 or 8 bushels in each, chopped tares, clover grass, nettles, or any juicy vegetables that will ferment. On these some gentlemen pour a few gallons of boiling water, and cover immediately with cut straw, which must be well trodden down

as the process of filling the place proceeds, during which, salt, in the proportion of 28 lb. to 1 ton of chaff, may be sprinkled on. Much depends upon the way in which this is trodden down, as one great object is to get the mixture as solid as possible. After a few days fermentation will be set up, and continue for three or four weeks; and the promoters of this system say that after the heat has subsided, the chaff will have acquired the scent of hay, and keep any length of time. But which ever plan is adopted, it will be wise to follow the old-fashioned but useful practice of giving a bran mash on a Saturday night, which will have the effect of carrying off these offending secreted matters, and prevent this mechanical stoppage.

WATER.

A few words upon the subject of water. The quality of water best suited to the horse is one moderately soft—not rain water collected in tanks—for that soon becomes foul and affects the health; on the other hand, hard water does not suit, some being apt to produce hide-bound and diarrhœa; but sound horses may become used to hard water, and it will agree with them. The water which is given the horse will effect his condition, if it is not suitable to him in quantity and quality, or if allowed to take it when heated by work. Thirst is very distressing to a horse. If he has not water when his stomach demands it, he will refuse his solid food, or drink, when he gets the chance, to excess. If tanks are used they must be kept very clean, or the water will get foul, and the sides covered with a slimy deposit, which not only renders the water unpleasant to the horse, but prejudicial to his health. Horses eating tares or succulent vegetables do not require so much water, too much water given them will often cause gripes; even the usual quantity of water will be found too much when they are first put upon cut grass or tares.

IMPORTANCE OF LOOKING AFTER THE FEET.

In the stable management of the feet, constant care is required, for not only are they artificially protected by shoeing, but are compelled to stand upon a substance which is not like the surface of the earth, in a state of Nature, destined to bear them. Neglect a horse's feet, and they become hard and brittle; let them stand where they are constantly soaking upon wet filthy litter, and thrush will soon do a sad amount of injury to the fleshy secreting parts, which it is the office of the hoof to protect. It is then a most important stable duty to see that the horse's feet are properly attended to. First, to prevent the feet becoming too dry. Second, to prevent thrush, which is caused by keeping them too wet. Third, to see that the shoes are removed when necessary, are properly secured, and that no clinches of the nails are started, so as to endanger the other leg. Now, the attention necessary to keep a horse's feet from getting dry and brittle, is a subject of controversy; one recommends a stopping, which another calls favourite filth, which, if long continued in, will produce thrush. I think a mixture of cow-dung and clay forms a stopping which to most feet will be used with advantage, say once or twice a-week. Exception to this would be, when a horse had either a very flat or a pomiced hoof, in which case I would not stop them at all. The use of warm water will be found, with the occasional application of some good hoof ointment, most valuable for dried, hardened, or brittle and shelly feet. Let the feet be immersed and soaked in a pail of tepid water as often as it appears necessary, and then dried and the ointment rubbed into the coronet and crust; nothing pays for attention given them better than the feet. What adds more to the perfect finish of a horse and his intrinsic worth than a good shaped, strong, and perfect foot? And, on the contrary, no matter how good a horse may be in other respects, an untidy, ragged-looking foot is as much an eyesore as the same thing amongst ourselves. When shod, I would insist upon having the hoof left externally as nearly in a state of Nature as possible; for the same reason, I would have the rough, horny, elastic frog untouched, in order that it may fulfil its functions as an insensible pad to prevent the jarring of the

upon hard ground. I would never
e with the sole. It is the natural pro-
n of the delicate internal parts of the
and infinitely superior to the leather
ad substituted for it. You may have
arrel with your smith, who generally
to leave the foot what he calls tidy, and
and polishes off the very coating which
e has provided to keep the hoof strong;
your wish be carried out, you will be
by keeping your horse's feet in a con-
to stand the wear and tear demanded
m. I think, as a rule, gentlemen are
ware how much may be done, by careful
ng and attention, to improve contracted
ttle and shelly feet. I could scarcely
e it possible that such changes could
fected in the hoof of the horse if I had
en them practically developed by the
proper remedies.

ADVANTAGES OF EXERCISE.

to exercise, no argument is necessary
the need of exercise amongst stable
; but the custom is very much to
e the fact, except, of course, in the
where regularly professed grooms are

Without regular exercise no horse
e kept long in health, and I am quite
ed that even when a horse is hard-
ed he would be better for a short airing
morning after feeding, than to stand
hole day without it. It removes bodily
ictions, promotes the secretions and
circulation. By air and exercise we
two material points, viz., the preserva-
of the horse's health, and the promotion
ndition, enabling him to go through
energy and vigour the exertions re-
l of him.

PHYSIC AND FOMENTATION.

now come to physic. In my previous
ks I spoke of physic as necessary for
urpose of getting rid of accumulated
thus, in the case of a horse brought
m grass, it will be generally necessary
lways useful. Let us consider this sub-
nder three heads:—

As enabling the stomach to throw off
ous food.

2. To give the stomach tone and strength to bear the increased stimulus often supplied by the food necessary to get a horse into condition, especially for hunting or fast work.

3. In conjunction with the necessary exercise to get rid of internal fat, and any lurking tendency to disease.

1. As to the effect of physic enabling a horse to throw off injurious food, &c., generally, 4 or 5 drachms of aloes will be sufficient for a hack or hunter fresh from grass, and from 1 to 2 drachms more for a cart horse; no preparatory mash need be given, as the grass has done all that is necessary. This applies to the horse that comes up with plenty of size; a horse low and lean would not require it.

2. The cooling properties of physic render it very valuable in the preparation of horses for work. If at any time the legs get hot, there is no better way of relieving the unpleasant symptom. It will be proper to give a mash or two first. I believe you would get at the same result by withholding a portion of the corn, but it is then at the sacrifice of condition, and from long experience and a constant anxiety to get at the facts. I conclude that after the dose of physic the corn may be gradually increased, and with proper exercise and a mash once or twice a-week, will be found the very best means to obtain that perfect condition which is the pride of every owner of horses who is worthy of his trust.

3. To remove superfluous fluids from the body through the agency of blood vessels, absorbents, and secreting organs, all of which co-operate to remove depositions of fat lodged around the heart and other internal organs. Before I leave this subject, let me caution you against the use of physic in which aloes is a component in any of the following cases. Inflammation of the bowels or intestines, bronchitis or influenza, or other affections of the mucous membrane, and it is a treacherous remedy when given in inflammation of the kidneys or during pregnancy. A horse has been killed by only a 3-drachm dose of aloes when suffering from bronchitis, and I have seen horses at the point of death

by the injudicious administration of a dose of aloes in influenza. Fomentation is a stable duty often practised, but seldom with judgment; it is a very essential adjunct in the treatment of disease, and a few words upon this subject may not be uninteresting to you. In most cases of broken knees, for instance, instead of fomentation being a comforting and soothing process, it is exactly the contrary. The dabbing and smearing a wound of this character irritates it, and rather distributes than removes the finer particles of dirt over the entire surface of the wound. To foment a broken knee properly, get a perfectly clean sponge, with a pail of milk-warm water, soak the sponge, and press it upon the leg above the wound, and not upon it; by this means the sponge is kept free from grit, and the water in the pail also, whilst the stream of water running down the limb carries away all loose dirt from the surface. It must be remembered that the sopping and smearing cannot remove gravel or dirt embedded in the injured part. I cannot lay down a rule as to the exact temperature at which fomentation ought to be applied, as the nature of the disease and the part to be fomented must be considered. For the eye, the temperature of the water should be about 100 deg., for strains and bruises as hot as the hand can bear, and for inflammation of bowels, pleuro-pneumonia, and other cases in which counter irritation is useful, the water must be scalding hot, the hands of those who wring out the cloths being protected by being wrapped in coarse towels. The chief disadvantage in the use of fomentation is the aptness to withdraw it before the heat and moisture have had time to do good, and the rapid cooling of the part by evaporation and contact with the cold air. Therefore, after the operation is over the parts should be rubbed dry, and well clothed or covered, to prevent the rapid diminution of temperature which ensues from evaporation. Some gentlemen use a fomenting pail, which I have seen of much service where the limbs require a long continued fomentation. It was made with a double bottom, and of sufficient depth to admit the horse's leg up to or beyond the knee. Blistering is a stable duty so clumsily performed that the efficiency of the application is almost lost or rendered inactive. When a cantharidine application is used, cut off the hair as closely as possible, and rub the ointment in with the hand for ten minutes, leaving a good quantity smeared over the surface afterwards. If the legs are to be blistered, let the heels be protected, by being smeared with lard, which will keep the action of the blister confined to the part requiring it; keep the head tied up, and put a cradle on the neck. Let the bedding be of short litter or saw-dust; do not let the horse stand on the bare pavement, as the irritation and pain the ointment produces may make him jar his feet and legs by stamping. After a week a little neat's foot oil may be smeared over the part with a feather to keep the scales moist. In using the Scarlet Biniodide of Mercury ointment, care must be taken not to remove the air, as when ordinary blisters are used; the ointment should be rubbed into the part for two or three minutes, and the horse's head tied up until the irritation is subsided, and a little may be smeared over the part on the second day very lightly, without disturbing the scaly secretion, which, after some days, will fall off, and then the part may be dressed over again if it requires it.

NURSING.

With reference to nursing, I would say that to nurse a horse properly after an attack of any debilitating disease, is one of the offices owners of horses are called upon to superintend, and the way in which this is carried out exerts an influence, greater for good or evil, than is often understood. It is not so much the care which is taken as the knowledge which directs it, which has a successful issue, the care may be ill directed and leave no good result, but the nursing carried on with judgment will have the best effect. How often do our most eminent veterinary authors tell us that the treatment which follows after the more active symptoms are passed, consists more in the nursing than in the physic; for the medicines having done

their part with a disease, what remains to be done is to give the body support, by proper nourishment, and help Nature to repair the damage. After inflammation of the kidneys, scalded linseed and an occasional mash, to which linseed has been added, will form the best food, and no water given without sufficient linseed added to make it slightly glutinous. After inflammation of the bowels, to give bran is a positive poison. Mashes are not to be thought of; hay tea well made, and thin gruel, about 1 lb. of flour to a pail of boiling water, must be the diet and nourishment allowed the first day of or after recovery; next day a feed of boiled roots, not allowing more than one-third the usual quantity, for the weakened state of the affected organs will not allow of large quantities of food being taken at a time; after this a few crushed and scalded oats may be given, but it must be some days before a horse is put upon his regular diet, or permitted to eat hay. After bronchitis, the food should be thick gruel, no solids; avoid loading the stomach, give water with the chill off; let boiled roots or crushed and scalded oats be the earliest approach to natural diet, and when recovery is effected, let all the hay be damped, for nothing is worse or more likely to irritate the highly sensitive bronchial coverings than dust from the hay. The nursing during or after inflammation of the lungs should be hay tea, with a little oatmeal boiled in it and strained, and as improvement goes on, make the hay tea thicker, and add 2 lb. of boiled potatoes per day. When the appetite is eager for food, give a pint of crushed oats, well scalded, six times a-day; do not overload the stomach, or allow a full meal. Let the rule during recovery from any of these debilitating diseases be little food and often, and what is given really good; do not stir a handful of flour or oatmeal into a pail of water, and call that gruel. Let the gruel be made with boiling water, that the starch may be liberated, and it will not only be more palatable, but more nutritive and easy of digestion.

THE TRAINING OF HORSES.

A NEW era in the history of colt-breaking may be said to date from the time when Rarey astonished the British public by the facility with which he mastered the most unruly specimens of the equine tribe. The animals upon which the "horse-tamer" displayed his power were not such as are ordinarily encountered by the breaker, for the majority had already, from their vicious propensities, acquired questionable reputations, and defeated the efforts of all the rough-riders who had undertaken to subdue them. But though all previous efforts had proved abortive, and though each succeeding failure had only served to confirm them in their obstinacy, they now, without exception, acknowledge themselves worsted in the fight, and surrendered to the superior prowess of Rarey, who succeeded, after a few lessons, in making them models of patience and good manners. Nor had this sudden docility anything of a transitory nature, lasting only so long as the steed was in the power, and under the influence of him by whom the mysterious change was effected; but, on the contrary, the impressions produced were durable, and retained their vitality when the animal had passed into other hands.

Thus the superiority of the new system, over all its predecessors, having been incontestibly established, all classes manifested the greatest eagerness to be initiated, and notwithstanding the high fee charged for admission to his lectures, hundreds enrolled themselves under the American's banner.

The secret regarding the *modus operandi*,

says the *Irish Sportsman*, was at first well kept; but when circumstances occurred to render this no longer possible, Rarey absolved his pupils from their promise, and a large number at once commenced horse-training on their own account. But though his followers obeyed the instructions they had received, their success was anything but uniform; for while some almost rivalled the "Tamer" by the satisfactory results which they achieved, others were unable to obtain the slightest advantage over any colt more than usually headstrong. It then became apparent that the personal merits of Rarey had much more to do in the matter than was at first conjectured; and that in this, as in every other undertaking, the individual qualifications of the practitioner had to be taken into account. That part of the new "art of equitation," to which public attention was at first principally directed, consisted of the methods adopted by Rarey for overcoming horses that were peculiarly difficult to manage; but though tying up the fore-leg, making the colt, when thus secured, walk about, compelling him to lie down when ordered, and such-like performances, were powerful aids towards mastering an animal that, from having been frequently tampered with, had become almost inveterate, and therefore required the adoption of strong curative measures, these exploits were very far removed from constituting the only valuable part of the discovery.

The number of horses likely to be benefited by such treatment, was insignificant, whilst the colts usually met with would thereby have had their tempers completely spoiled, and their spirits utterly broken; so that, had this constituted the whole of the new system, it would have had but a very limited sphere of usefulness, indeed. Such, however, was not the case, and this the public speedily preceived; but the discovery of the truth, that "the colt requires to be gentled, not bullied, and taught, not terrified," was the fundamental axiom upon which the new mode of horse management grew and flourished.

A secondary result, arising out of the unprecedented success that attended the treatment of the most difficult cases undertaken by Rarey, was the fact that colt-breaking became a highly fashionable pursuit, and gentlemen did not consider themselves demeaned by an occupation that had been, up to that time, delegated almost exclusively to the professional rough-rider. Thus a superior intelligence has been brought to bear upon the horse's education, supplemented by ways and means of subduing him, hitherto undreamt of, many antiquated prejudices, which had hitherto held uncontrolled authority within the precincts of the stable, were exploded, and, as a natural consequence, the number of vicious horses steadily decreased.

Though the great regenerator of horsemanship has passed away, the beneficial results of his instruction still remain, and, in a greater or less degree, have permeated the length and breadth of the land; so that those owners who, from various causes, are unable or unwilling to undertake the instruction of their stud, can now, without any insurmountable difficulty, obtain the services of some professional horse-trainer, who, though perhaps unwilling to be considered a disciple of Rarey, has nevertheless been insensibly influenced by the merits of a system which he affects to despise.

But although horses have been allowed to run wild until either they have arrived at maturity, or at least till within a few weeks of such time as their services may be required, are, by the adoption of proper means, even then rendered wonderfully docile and subservient, still they never have the same degree of confidence established between them and mankind as those who, from their earliest youth, have been gradually accustomed to those sights and sounds amongst which they have to pass the useful portion of their lives. This was a fact which Rarey took especial pains to impress upon his followers; but one to which, captivated by the more exciting feats of resolution and dexterity, required to conquer a full-grown untamed animal, whose very nature had been rendered savage, they did not accord the attention it deserved.

Many of the accidents, which are of daily

urrence, must be attributed to the habit of rying half-broken colts into harness, and n expecting them to display an amount of ıdiness in positions that would tax the ves of the well-trained steed; while, had y been accustomed to be led about, and otherwise "gentled" from their earliest colthood, a degree of self-possession and reliance in their driver would have been cheaply purchased, which not even the fears of future ill-usage would have completely eradicated.

CLYDESDALE HORSES.

THIS breed appears to be very favourably regarded in Australia, if one may judge m an article on the subject, in the *Australian*, Melbourne, Sept. 10. We condense : following extract :—

Scotland must be well off for Clydesdales, if : can spare, without missing them, even as ny as are brought to this country each ison. Like the Scottish men, the Scotch rses are a hardy race, prolific in their own ıntry, and thriving well out of it. That they : becoming the dominant breed here, to the :lusion of all, is proved more clearly at each ıual show. It is not long since that two rses, Prince Charlie and Blackleg, took the ımpion cup alternately for several years, no ıer horses being thought of for it; but if such up were to be offered now, there would be a :en at least, and the judges would have no ;y matter to award it satisfactorily. This is w, therefore, becoming, or rather it has be- ne, the great emporium for draught horses, as smania was formerly. The number landed reases every year, and supply and demand m to increase in a like proportion. More ses were sold this week, at prices ranging n £400 to £600, than at this time last year, ı fetching respectively £850 and £875, a sure sign that the market is far from overstocked yet. Had we fifty Clydesdale mares for every Clydesdale horse, our plough and road teams would soon be better worth looking at, but forty-nine out of every fifty brood mares are mongrels, and blood will tell even in the breeding of cart horses. * * * The stock of the imported horses is seldom equal to themselves in appearance. They are improved according to the modern fashion of over-feeding. We must take them as we get them, but in regard to fat and superfluous flesh, so obtained, we must not expect like to beget like. It is quite useless to repeat that sires of moderate size always get the best stock, if their blood be right, for animals brought out on speculation must be of a kind to sell, and the heaviest draught horses, as well as the heaviest bullocks, fetch the most money. However, the Clydesdales are, as before said, a hardy breed, and can bear a large amount of good treatment without injury to their constitutions, and have mostly legs sufficiently strong to carry a good weight of needless flesh without becoming unsound. Therefore improvement of the modern sort will be long in spoiling them, and for this we should be thankful, as we are plainly destined not to have a vestige of any other breed left here soon.

The Dairy and Poultry-Yard.

AMATEUR TEACHING.

POULTRY keeping is a very economical business for private families in towns who have the accommodation, and very profitable for farm-houses, where the cocks and hens are properly looked after. We have very often enunciated these views, and we are glad to know that the advice given has been acceptable in many households, that not a few farm-yards have been made more productive by the introduction of poultry. At all farm steadings there is necessarily a great deal of waste; or rather, we should say, a proportion of grains fall aside that cannot be made the most of unless there is a Dorking, a Spanish, a Brahmapootra, Cochin China, Hamburg, or any other variety or mixture of fowl to pick them up. This refuse, as we may call it, forms a good nucleus upon which to start a systematic feeding of fowls for egg, or for pot purposes, or both. In fact, the breakfast and the dinner table in the case of fowls should be closely allied. Most profit, we are of opinion, is derived when the breakfast and the dinner table go "hand and glove" together. Having long held and advocated these views, we are glad to see that our contemporary, the *Food Journal*, is following in our wake, and pointing out the benefits likely to accrue from giving more heed to the "chuckies." But we are sorry to add that the writer in our contemporary appears to know very little about the subject upon which he is writing—in fact, his experience appears to consist more in what he has inaccurately gathered from newspapers, than in what he has seen with his own eyes. In proof of our opinion, we need hardly do more to convince practical people that we are right, than quote the paragraph, which is sent round to us, from the *Food Journal*. The writer says:—

> The deficiency of our own poultry supply mainly arises from a want of systematic enterprise. Many people "go in" for fancy poultry, and even for ordinary descriptions, with an eye to prizes at a poultry show. Farmers' wives and daughters have the poultry for pin-money, and hundreds of people "keep fowls," utterly ignoring the consideration that fowls might be made to keep them. But as to poultry-keeping on a large scale, with an eye to meeting an ever-increasing demand, this is quite an exceptional state of things. Fowls—using the word generically—should receive attention like sheep or pigs, or even more, for they are more delicate and susceptible to diseases; but many of these are preventible, and the result of bad management, or of no management at all.

We have often extracted from the *Food Journal* with satisfaction. We quote the above in small type from so generally sensible a periodical with astonishment. For why? Because, in the first place, there is nothing in it from which one can gather any instruction in the way of making poultry profitable; in the next place, the writer does not appear, from the rest of the article, of which this is a specimen, to be quite sure about the markets existing in London; and in the third, that people thoroughly acquainted with poultry-keeping, as conducted by our best exhibitors, know that pin-money is not the destination of the prizes which the fowls win, neither is it of the proceeds which their products and their sales bring.

HAND-MADE CHEESE.

GERMAN hand-cheese factory has been established in the southern section adelphia, by Mende Brothers, which is arried on with much success. The *al Farmer* says :—

was to us an entirely new industry, iting what we have often had to re-

that if farmers would give their ss more thought and study, it will be to embrace many subdivisions, and greater variety than the old stereotyped n of corn, oats, and wheat.

: business which Mende Brothers stablished, is that of purchasing from mers of Chester and Delaware, Bucks Montgomery counties, curdled milk, only known as cottage cheese, "smear-

It is brought to them twice a-week in or which they pay about 20 cents per , and by weight in winter, 3 to 3½ per lb. They consume in this way the f about 2000 cows annually. Their is a massive brick building, 40 feet by ive stories high, with basement, and variety of very ingenious machinery, all ch is propelled by steam power, and is le of making 50,000 of the hand s per day of ten hours, or fifteen ns per year, and does the work of at fifty hands. The curds, on being re- at the factory, fresh from the dairy, aced in bags holding perhaps a couple shels, and are allowed to drain en- dry. They are then emptied into wooden troughs, and manipulated with n shovels, a certain amount of salt and caraway seeds being mixed through the

It is then thoroughly ground up by nery, before passing into their principal ne, which is a most wonderful piece chanism. This moulds and delivers heese on sliding shelves, in three t rows, automatically pressed into ape of small cakes, about 2 inches wide by ½ an inch thick, which is found the most convenient size and shape for sale and shipment. This is done with the regularity of clock-work, and continues six days in every week in the year, at all seasons.

The after processes consist simply of these sliding shelves passing and repassing each other, through the hatchways, up to the large and well-ventilated drying rooms above, where they are arranged on racks.

The temperature of these rooms is accurately regulated by a thermometer; in cold weather, hot air or hot steam conveyed in iron pipes being used according to circumstances. The whole process of making the "German hand-cheese," from the time the curds are received, till finally packed in boxes for shipment, occupies about 12 days. The most scrupulous cleanliness and neatness is observed about the establishment in every part, and to secure entirely against danger from dust and flies, the cakes before the final shipment all go to the basement, where they are washed in great tubs of water, and again dried.

The supply of curd comes in winter from Bucks and Montgomery, and in summer from Chester and Delaware Counties, for the reason that farmers in the latter do not generally have winter dairies.

Messrs Mende Brothers commenced on a small scale six years ago, and the process by which they now manufacture the hand cheese is one of their own invention and improvement, for which they hold several patents. The main difference between theirs and the old mode of making this cheese, is that they produce in twelve days an article which will keep and bear transportation all over the United States; whereas the old process requires two to three months, with very uncertain results, and even under the most favourable circumstances, is hardly a merchantable article."

NEW STYLE OF CHEESE.

SINCE the inauguration of the associated dairy system, there has been a constant effort to introduce labour-saving appliances, so that large quantities of milk may be handled and manufactured in the best manner, and at the least expense. The improved cheese vat is a great advance over the old-fashioned tub. The curd knife, the milk agitator, and various other devices used in the "cheese making art," have contributed largely to the success of the system. Recently there has been invented an arrangement for pressing the curds, which has in view a complete and radical change in the style or form of the cheese itself. It proposes to do away with round surfaces, and substitute the square or oblong shape.

There are several advantages which these shapes have over the present style of cheese. In the first place, a less number of hoops or moulds for pressing the curds would be required. Then the cheese would be more easily bandaged; and, thirdly, it could be more economically boxed, when ready for market. In the manufacture of small cheeses, weighing from 10 to 15 lb. each, there would be a very important saving of labour, and in the cost of boxing, by using the square form. The inventor claims several other advantages, but we have named those concerning which there can be no difference of opinion among men who are familiar with cheese manufacture.

But, before discussing the question further, it will be proper to explain more fully how the curds are to be pressed and the cheeses of different sizes put in shape. The moulds which take the place of hoops, for pressing the curds, consist of a series of frames made from stout plank, the corners secured by iron clasps, and with one side opening on hinges for removal of the cheese. These frames may be made large or small, to accommodate the quantity of curd. They may be large enough to receive 200 lb. or more of curd at a single pressing, or for one press and screw. The cheese, therefore, when it first comes from the press, is in a large cubical block. It is then sawed up into oblong cakes of any desired size—a bandage wrapped about each cake, and put back in the mould in layers, separated with thin boards, when pressure is again applied. After remaining in press a proper length of time, the cakes are taken out and placed in the curing room, upon the shelf, and turned daily from side to side, or a quarter of a revolution at a time. Now, under this process it will be seen that a mass of curd of 300 lb. weight will require but one mould or hoop, and yet a dozen or more cheeses may be formed out of this cubical block, with much less labour and expense than when round hoops are employed for each cheese.

Another very great advantage in the oblong cakes is the ease with which they may be boxed. The material for making the round wooden box is becoming scarce and expensive, and already inquiry is made as to a substitute. We cannot go on using the round wooden box for any great length of time, because the scarcity of material, or the long distances which it will have to be transported, will render this form of box altogether too expensive. Paper must undoubtedly be used as a substitute for the wooden hoops, and even to-day, it is claimed, a good, substantial paper box may be furnished as cheaply as of wood. A square box, on the other hand, is easily made, and is much less expensive than any other form of package. In shipping the oblong cakes, a number can be packed together in one case, thus still further reducing the cost of package.

The demand for a small-sized cheese—one weighing from 10 to 15 lb. is increasing from year to year. Such cheeses are much needed for home consumption, but hitherto the trouble and expense of manufacturing small

cheeses have kept them on the market only in limited quantity. It is believed that the home consumption of cheese would be greatly promoted by a large manufacture of these small cheeses, and Mr Holdridge, the inventor of the oblong cheese, claims that these shapes would be more convenient to the grocer, since the weights can be cut by measurement; while at the same time a square or oblong form is more economical to the consumer, because it can be more readily cut without waste for the table than from a round shape.

The oblong cheese is very easily bandaged. A long strip of cloth is damped and laid upon the table, and the cheese simply placed upon it and rolled over until it is completely covered. The cloth is then cut, where the lap comes on the cheese, the margin at the ends turned down in place, and this completes the work of bandaging. This, it will be seen, is much more readily done than when the cloth has to be measured in pieces and the ends sewn together and then slipped over the cheese.

Mr Holdridge claims that the oblong form is of great advantage in preserving the flavour of cheese while curing, inasmuch as the escape of the whey by evaporation is facilitated; for as the whey percolates toward the bottom of the cakes, and the cakes being turned from time to time only a quarter of a revolution, the whey, instead of turning back towards the centre of the cheese (as in the case with round cheeses), is turned at right angles thereto, and is, consequently, always tending towards the outside. The whey, therefore, is so far expressed and evaporated, that decomposition is much less liable to take place. The cheese, it is claimed, cures better than round ones, as the gases, if any be generated, escape from the end of the cheese, and are not forced back and forth through the cheese, as with the round ones. The consumer, when cutting these cheeses for the table, turns back the bandage from the end, and cuts a thin slice of cheese, which is to be retained for the purpose of sealing the cheese. Then any number of slices desired for the table are cut, and the cheese closed by replacing the thin slice first taken off, together with the bandage, and setting the cheese on end, when it is sealed and safe as one uncut.

Without endorsing all the advantages claimed for this new style of cheese, we have enumerated some, at least, which are of sufficient importance to recommend it to the attention of the dairy public.

In making any radical change in the style of cheese, the market and the tastes of consumers, of course, must be consulted. If the prejudice of consumers be so strongly set in favour of round cheeses that a less price is obtained for oblong shapes, then this must militate against their introduction, notwithstanding the producer may see clearly the several advantages named in manufacturing. We are informed by dealers who have been handling a limited quantity of oblong cheeses, that they sell readily, and at a price equal and even better than the round style.

Some factories have been proposing to manufacture small cheeses, but on account of the great number of pressing hoops required, and the extra labour of pressing and bandaging, have been deterred from manufacturing small round cheeses. To such factories the oblong shapes obviate the difficulty, and the change proposed will claim attention.

As we have endeavoured to keep our readers thoroughly advised in regard to all improvements or changes proposed for dairy practice, the above description of the new style of cheese will be of interest to many who are desiring to keep well up in all that pertains to dairying.

CHEESE FACTORY SYSTEM AND CO-OPERATIVE FARMING.

IN a paper recently read by Mr Jenkins, Secretary to the Royal Agricultural Society of England, on this subject, the lecturer, after giving a description of the practice pursued in private dairies, proceeded to notice the factory system of cheese-making as pursued in America.

The advantages of the latter system Mr Jenkins considers to be mainly two—economy of production and superiority of produce. It seems that it has proved so successful in the United States, that it has ramified in some other directions besides that of the making of cheese. "The first of these off-shoots," says Mr Jenkins, "was termed by its originator (Mr Alanson Slaughter) a Creamery Association; and by this name are still known numerous joint-stock establishments for the supply of large towns with milk and cream." Mr Willard states, that within a few years past "creameries" have been established within convenient distances along the route of the railroad, where the milk is cooled, and there shipped to the depot. Here farmers daily deliver their milk, night and morning, as at our cheese-factories, where it is measured and credited, and no further trouble is had with it on their part. At the creameries, however, a very important operation has to be performed, viz., that of cooling the milk. As the milk-trains run only once a-day, a portion of the milk when it arrives in New York, and is ready for the milk-carts, is thirty-six hours old. To carry milk sweet for that length of time in hot weather requires some art in handling, and this seems to be well understood by the Orange County farmers. The milk, as soon as it comes from the cow, is strained, and put in long tin pails, which are set in water, care being taken that no portion of the milk be higher than the water. These pails look like sections of stove-pipe, being 8 inches in diameter, and from 17 inches to 20 inches long. The milk is occasionally stirred so as to keep the cream from rising. It is deemed important that the animal heat be removed as soon as may be, at least in an hour's time after it comes from the cow. The milk stands in the pails until ready to be carted to the trains, when it is put in cans holding from 50 to 60 gallons.

BUTTER FACTORIES.

The other development of the factory system has taken the form of butter factories. Their establishment was in great measure forced upon the farmers in consequence of the counter-combination amongst town dealers in milk, after they perceived the effect of the creamery associations. The interests of the producer and those of the dealer were of course antagonistic, but the farmer was placed at a disadvantage, in consequence of the perishable nature of his commodity. The butter-factory system, however, rendered him quite independent, as he could convert his milk, if need be, into an equally saleable commodity, possessing higher keeping qualities. In addition to this, he reaped similar advantages with regard to quantity and quality of produce, as well as economy in production at the butter-factory, as he had previously done at the cheese-factory. In fact, we are told "that the butter factories have been a great success, because they have been enabled to turn out a very superior article, uniform, and one that can be relied upon in the market. This uniformity and superiority in the quality and flavour of the butter made at these establishments are such that it is eagerly sought after, and commands extraordinary prices." The only point in the management of a butter-factory which it is necessary to notice in this paper is the manner in which the manufactured article is disposed of. The butter is usually entrusted to persons who are known as "captains," and who make it a business to collect it from the factories for sale on commission. Mr Willard

emarks that "these captains go with their 'freight' twice a-week, are men of standing and responsibilty, who are well posted in the trade, and know how and where to obtain the best prices." Special offers for large lots of butter are sometimes received by the captain, but in such cases the decisions rest with the authorities at the factories.

CHEESE FACTORIES IN DERBYSHIRE AND AT TATTENHALL.

I regret that the more striking of the two endeavours which have been made does not present the characteristic features of a truly commercial enterprise. This deficiency is, however, to the farmer, more than counterbalanced by another and a greater advantage. I mean, by the evidence which it affords of the good understanding which exists between landlord and tenant in the dairy district of Derbyshire. Whatever may be the ultimate result of the experiment from a pecuniary point of view, there is no doubt in my mind that the energetic and enlightened manner in which the experiment has been projected and sustained by some Derbyshire landlords, has convinced many of their tenants that the interests of themselves and their landlords are identical. Considering how wide-spread is the belief amongst the smaller class of farmers, that what benefits the landlord must necessarily be taken out of the pocket of the tenant, I cannot help feeling that the Derbyshire experiment is likely to have a very beneficial effect, entirely apart from the question of the merits or demerits of the American system of associated dairies." It must be noted that the Derbyshire and the Cheshire experiments differ in one important feature—the former is the result of enlightened liberality on the part of landlords; the latter is the consequence of commercial enterprise on the part of a tenant. The inference, therefore, seems just, that the cheese factory system, properly managed, will be a national as well as an individual benefit. In another feature, however, both experiments present a striking coincidence—viz., it being based on the system of the purchase of milk. I regard this coincidence as striking, because, both from America and Sweden, as I have already stated, my informants remark that this system has been found to produce the least satisfactory results. The reason of its adoption in these English endeavours was simply, I believe, that the farmers were either materially unable, or mentally unwilling, to run any risk in the experiments. Therefore the promoters of these factory schemes were obliged to pay the farmers for their milk a price even larger than that they usually obtained for it in the form of cheese, besides taking the labour and risk off their shoulders.

CO-OPERATIVE AGRICULTURE.

By the term "co-operative agriculture" I do not refer particularly to those joint-stock farming companies which have recently attracted considerable attention. I attach to the phrase a much wider signification, and this evening it has been my endeavour to trace the history of the development of its most vigorous manifestation. We have in England, however, other examples which bear the impress of a vigorous youth; such are, for instance, the Driffield Linseed Cake Company, the Northumberland Steam Cultivation Company; but, with regard to the utilization of our home-grown produce, co-operation in agriculture can, as yet, hardly be said to have come into existence, but the efforts recently made towards the establishment of cheese factories shew that the day has nearly gone by when the English farmer will continue to be both producer and manufacturer. Butter and cheese are probably the only remnants of a system which once extended to all the wants of daily life, from the bread that was eaten to the clothes that were worn. The American farmer and the Swedish peasant-proprietor have both gone a step farther. They produce the milk, and send it to the manufacturer to be made into butter or cheese. This is as much a matter of course to them as it is for the English farmer to dispose of his wheat to be ground, and of his wool to be woven. The reason why a practice, which has been so long abandoned by us in the instances of corn and wool, should still be retained in the case of milk, are simply these—first, corn and wool

may be kept for months or years after they come into the farmer's hands, while milk must be dealt with in a few hours; therefore, without co-operation, it has been a necessity to manufacture the milk at home into a product that will keep, except where there exists a daily market for it at a moderate distance. A second reason is, that the processes of cheese and butter manufacture leave a *residuum* which, until now, could not be dealt with profitably except on the farm; but this is not the case with the other articles of agricultural produce. The cheese-factory system meets both these requirements of the milk-producer; therefore I believe it will utimately succeed. I am not aware that any organization or company comparable with a butter-factory exists either in England or Ireland; but with regard to milk the case is different, as the Aylesbury Dairy Company, for the supply of London, and Harvey's Dairy Company, for the supply of Glasgow, are both founded on the same principle as the cheese factory experiments which I have already described—that is, on the basis of the *purchase* of the milk. The further development of the principle of co-operation is a striking characteristic of continental agriculture. Every student of foreign farming must have noticed the great extent to which "industrial crops," as they are termed, are grown in certain parts of France, Belgium, and Germany. Sugar-beet, the most important, is a fair examp will not bear the cost of being conv long distance, it will not keep for an nite length of time, and the residue sugar factory or the distillery can be ably used only on the farm. But the is enabled to grow this very lucrative c co-operation with the manufacturer. It quite clear that, if the beet-sugar m ture is to be established in England, t mers and the manufacturers must co-c for that purpose. At present the farm not grow the root because there is nc factory in his neighbourhood, and the facturer does not erect a factory beca sugar-beet is grown. Similar reason prevented the extension of the cultiva another lucrative crop—viz., flax. Th lish farmer will not grow it for straw (it valuable portion) because it must be before it is sold, if he wishes to obtain t value for the fibre. His people do not stand the process, and the quality of th is, therefore, more or less ruined. Bu example of the Belgian farmer were fol the flax would be sent to an English *trai*, to be retted by competent just as, under the system of assc dairies, milk is sent to a factory made into butter or cheese by a skilful man.

The Apiarian.

EXPERIMENT IN FEEDING BEES.

THE season of 1869 was one of the poorest ever known in this country for the honey bee. Thousands of stock came out in the spring of that year, weak in numbers, and many were but poorly supplied with honey and pollen; and adding to this a cold, backward, and unfavourable spring, the prospect for securing many new swarms or much surplus honey was certainly not very favourable. But few stocks commenced, with us, to raise brood with much activity until the warm weather of June; and, as a consequence, new swarms did not issue until late in the season. The cold and excessive wet weather which followed throughout most of the honey season came nigh utterly destroying the sanguine hopes and expectations of thousands of bee keepers in the Northern States; and I know of many persons that had kept bees successfully for several years, who, losing every stock which they possessed during the last winter, have abandoned the pleasant and profitable occupation of bee culture in disgust. And now I ask, might not very many of the bees which perished the past winter have been saved with but little outlay of time or money? I will now relate an experiment that I made last season, which fully proves to my own satisfaction that the above question can be answered in the affirmative. It is a well-established fact that if the dairy farmer would secure an uninterrupted flow of milk from his cows, he must provide them an abundance of green succulent food during the months of August and September, when pastures generally become dry and parched. And if, from any cause, forage is cut short, is it not equally important that we feed our bees as our dairy stock? It is now well known that when the bees are gathering honey with activity, that the queen lays rapidly; and, on the contrary, if they remain idle, she will lay sparingly or cease entirely until honey again becomes abundant.

But to return to our experiment. July had been a cold, disagreeable, and excessively wet month, and the first half of August was equally as unfavourable for the honey bee. I selected a small, second swarm, that had come off quite late, and commenced feeding them in the following manner:—I placed a box 6 inches square, having neither top nor bottom, over a small aperture in the honey-board; then filling a small shallow dish with liquid honey holding about 4 ounces, placed it in the small box and covered it up. This was done each day an hour before sunset, removing the dish the next morning. Small splinters of wood were placed upon the honey to keep the bees from drowning. This was continued until honey became abundant —about three weeks. As a result, this swarm at the beginning of winter was twice as strong in numbers as those that were not fed, and had double the amount of honey, though some of the latter were the best stocks in August. This swarm was left upon its summer stand for further experiment, but was over-turned on the evening of the 16th of January 1870, by the wind which swept over the Western States upon that night. It then contained at least 20 lb. of honey, while the bees were stronger in numbers than at the beginning of winter. Several of the combs contained brood in all stages of development. Many stocks that were in much better condition than this one, five months previous, had already perished in this vicinity. Does not this shew the importance of feeding our bees, whenever a supply of honey cannot be obtained.—*Herbert A. Burch, in Western Rural.*

Hunting, Fishing, and Shooting.

ENGLISH SALMON IN 1870.

IT is satisfactory to learn that during the season of 1870, most of the estuary fisheries throughout England have yielded a large amount of salmon. On almost every river the capture of fish shewed a considerable increase in comparison with the previous year; while in several districts salmon are reported to have been "more plentiful than ever." The result of the past season's fishing in the estuary fisheries is certainly most encouraging, and fully confirms the statements which we have frequently brought forward, to the effect that the salmon fisheries of England had made rapid progress within the last eight or nine years.

One remarkable feature regarding the capture of salmon in English waters, is prominently brought before us when comparing the results of the season's fishing in the upper and lower waters of our rivers. We find that while the capture of fish in the majority of the estuary fisheries was most productive, the take of salmon in the upper waters was in every instance extremely poor. On the river Severn, for instance, we learn that out of the 22,500 salmon captured in 1870, only some 200 were taken in the upper districts, hardly any being landed by rod and line. From the Tyne, Dee, Wye, Usk, Trent, and many other rivers, we hear the same story. "There were not so many salmon captured by the nets below, and never so few taken by the rods above." The drought, doubtless, had much to do with the small capture of salmon by anglers in English rivers during the last few seasons. We cannot, however, see any chance of upper proprietors obtaining anything like a fair share in the capture of fish, while the present destructive mode and monopoly of capture is carried on below stream by the lower proprietors. This, together with the short weekly close time, hopeles bars the salmon from reaching the upp tricts in any considerable numbers unti upon the fence months. Surely the a right to participate in a share of the fi the increase of which they have so contributed) should be more fully ac ledged than it is at present, and when ing the new Salmon Bill we trust the will receive consideration.

On the river Tyne the take of sal said to have been highly satisfactory. 36,000 fish were taken by the nets dur season. The Chester Dee is also re to have yielded a large amount of s the take in the lower waters being up average, while the fishing in the upp tricts was extremely poor. From the shire rivers we learn that the take of fi greater than in any former year sin Act of 1861 came into operation. (Trent, the season was more prospero capture of salmon in the lower wate double that of 1869. The season estuary being the best ever known. (Wye, the season in the estuary fisheri above an average: above the tidew nets did very badly, the season on th tion of the river being perhaps the ever known. The same may be said Usk; the estuary fisheries did well, wh capture in the fresh-water districts wa poor. From the Cumberland rivers, ports are not satisfactory, the yield of s in both upper and lower waters was an average. The season on the Lune, Taw, and Torridge, and most other was much the same as in the districts mentioned, the estuary fisheries yield average amount of salmon, while the c in the upper waters was very indifferer

The Country Gentlewoman.

THE DECORATION OF DRAWING-ROOMS AND DINNER TABLES WITH FLOWERS.

CHAPTER I.

THE love of flowers never becomes chilled; it is cherished by us in old age, as in the happy days of youth. To study them is always refreshing to our minds, and cheers the monotony of many a dreary hour. No room appears complete unless a few of such living beauties as flowers are displayed therein, be it in ever so small a quantity. As to a dinner-table being arranged without flowers or foliage, to shew the various delicacies off to advantage, the idea seems preposterous. Those who can command them must have them; besides, they form a topic for conversation which will always be hailed with joy by ardent lovers of Nature. It is not merely the flowers themselves that form the object of attraction, "but taste alone, in well contrived display," to deck the festive board, is freely commented upon. Everything used for the purpose should be allowed so to harmonize and blend together that no harsh lines may offend the eye. The light, airy, and artistic object must not only be effectively arranged, but the setting must be in keeping, else flowers and foliage lose much of their charms. I have now before me a vase of the most exquisite mignonette; and really its delicate fragrance and beauty are quite enchanting. To those in towns who have no garden, flowering plants and floral decorations must be a great boon, and the occupation of arrangement to ladies of taste an endless charm, whether arranging them for effect, grouping them for painting, fancy work, or any purpose of that description. In that case, they are of necessity more difficult to procure than when cultivated under our own supervision at home, especially in winter. Yet flowers at this season of the year seem to possess a greater charm than at any other. The eye is more accustomed in summer to witness such gorgeous displays, if not in our own gardens, in those so splendidly arranged of our public parks and various botanic gardens, that the indoor decorations are more neglected than in winter, when all these sights are lost to view. Even on the breakfast-table, how refreshing to see a newly arranged bouquet after the sweet repose afforded to us at night! In a lady's boudoir, flowers will be found a great acquisition, and, if prettily arranged with light-looking foliage, they present a most charming appearance. In order to assist those who are anxious to know about the flower and foliage decoration of dinner and breakfast tables, boudoirs, and other places, where cut flower ornamentation are in use, I shall in subsequent chapters descant upon the most effective method of arranging them.—*Annie M. Williams, Upper Holloway*

ALPINE WINDOW.

THERE seems no limit to the way in which taste can be gratified. And yet, what is taste? Let Homer answer—"Taste consists in a nice harmony between the fancy and the judgment," but it must come from the fancy and the judgment of the high priests of taste, else solution of it can be only a question of degree. To proceed, however—our architects design our homes with taste. Our landscapes are opened up to expose all the variety of beauty from such salient points as are considered most agree-

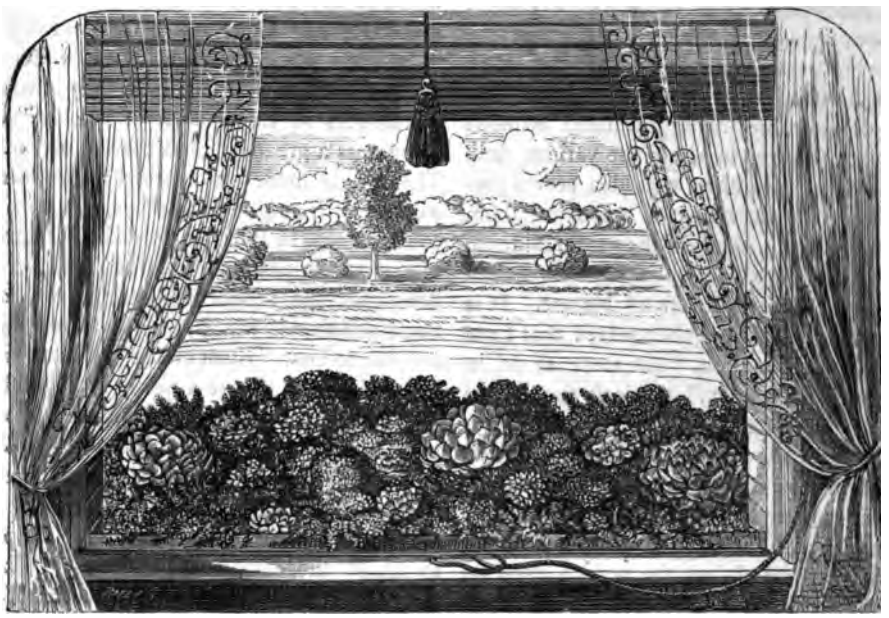


Fig. 1.—Sill of Drawing-room Window planted with Alpines.

able by those who are looked upon as presiding over the high courts of taste. Our lawns and pleasure-grounds, and walks and gardens of every imaginable design are planned and laid down with taste. Our greenhouses and hothouses, if they shine out in the dress foreground must have some of the more elaborate points of architecture about their outline, they must be built with taste. Our statuary, and fountains, and terraces all represent, or ought to be, the pink of taste. And now that we have shewn how well this can be done in forming the ground-work to p comfort and to the gratification of the æ eye, more particularly in country and su scenery, we want to carry out the id taste within cities, and we want to from a horticultural point of view. natural is beautiful at all times, even i colour culturists would call *en deshabi* it is scarcely less beautiful in itself whe of its choice or suitable subjects are s to merge in upon what might be called tic or artificial lines of beauty. And how much is the architectural pile en by the setting! How much, how very is the city tenement adorned by som arrangement as Mr Barr (of the well- firm of Barr & Sugden) has planne carried out (see figs. 1 and 2) as junct to his window, and a very beauti ting it makes!

"A so-called alpine window with beautiful combination of plants in climate! Impossible. Is it not a fa dream conjured up by a heated imagin

ıe very drapery mocks the *tout ensemble* plants, which may be set down like any her bevy of plants for parlour, or dining-om, or drawing-room decoration for a few ghts, and to be transferred afterwards to ore hospitable quarters. They would die r inches, they would die outright!"

Patience! gentle reader. Don't be carried way with the flood of the lecturer's elo-ıence. He condemns without trial. That ery window, so designed and planted, has een beautiful during the summer months, and for even winter decoration if the ground work be prepared, as the main thing to be avoided is cold draughts. Secure from them, city gardeners may proceed to design all sorts of abutments for their windows, and clothe them, too, with plants that will yield a crop of beauty, not so much in their individual capacity, as from their number and variety, throwing out tints that improve by contact.

In the lengthening days of spring, when snowdrops and crocuses, and tulips and hyacinths, yield up their blossoms, how much

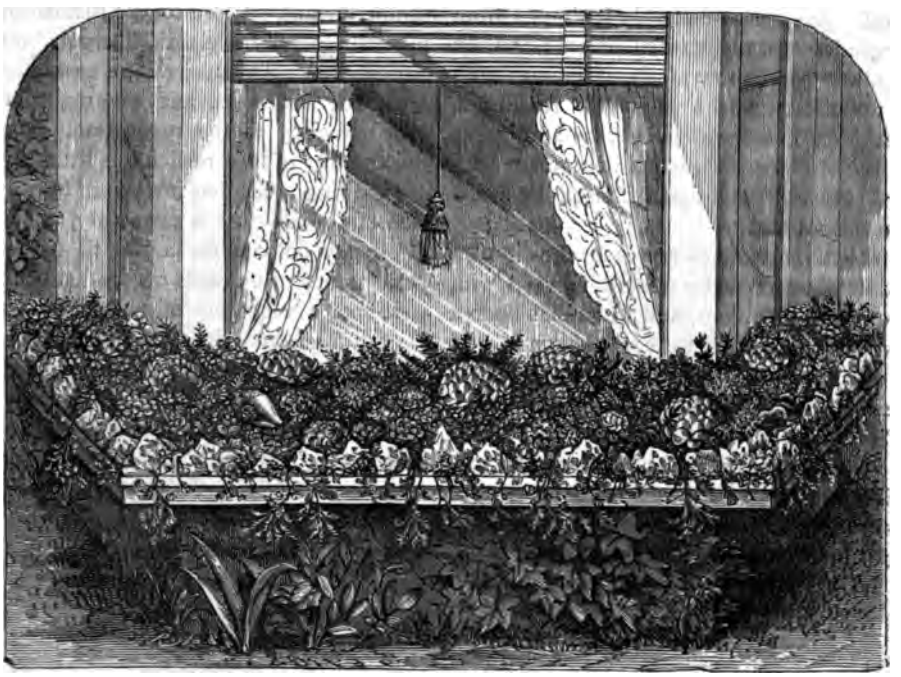


Fig. 2.—Sill of Drawing-room Window--Outside View.

ın be made comparatively interesting in the old, bleak months of winter. It is not very plant of a hardy nature that is suitable ır a London or a town climate; but by election there are many that live and grow, nd even enjoy life. Not the old plants that ere wont to be used for decoration cer-ainly, but such humble representatives of lant life as house-leeks, stone-crops, saxi-ages, cerastiums, antennarias, ivies, aucubas, warf cypresses, and thujas, and hosts of ulbs—and yet a large army, all suitable more beautiful must the window be; and then to see flowers rising out of the undulated, cushion-like bed, how much more beautiful is the spectacle! To the proprietor and in-dwellers, an assortment, such as the engrav-ings present, must generate a feeling of inex-pressible delight, far beyond what the mind assesses as the money-value transaction, and then the world cannot call it a purely selfish gratification. It may be beyond the reach of prowlers, who are bent upon destruction, and those who have not learned fully to

understand the eighth commandment; but fig. 2 is exposed to the view of every passer-by, so that it is impossible to estimate fully the gratification afforded. In this cold, somewhat inhospitable climate of ours, we cannot look for a continuation of gay colours. In truth, taste proclaims decidedly against the red, and the yellow, and the scarlet. We cannot away with that sort of Pompeian, gaudy style of decoration. Beauty and variety of form are most in demand; and some such style as Mr Barr has hit upon for window decoration merits our warmest approval. See how admirably it drapes from the window to the garden below; and, on the other hand, how nicely it merges with the upholstery in the interior. Reader of taste, living in a town climate, try and "save up" only to possess such an exquisite window. But let the designer himself be heard upon the subject.

"These illustrations represent the sill of a window planted in the summer of 1868, with close growing Alpines, and which has been a constant source of pleasure, summer and winter, ever since, with no other attention than watering when necessary.

Those who are confined much in-doors, and whose desire after the pleasures of gardening is strong, can have it gratified to a considerable extent outside their sitting-room windows; and as many of our readers will naturally ask how this may be accomplished, we feel we cannot do better than give them an illustration of what we ourselves have accomplished. Fig. 1 is given from the inside of the room; fig. 2 presents a view from the outside.

"The outer edge of the window-sill is rusticated to keep in the soil, which consists of road-scrapings and loam. This is moulded into hills and dales of various conformations. In depressions or valleys is planted blue sedum, and on the mounds and ridges distinct masses of different coloured sedums and sempervivums. Close to the rustication are planted Herniaria glabra, Spergula pilifera, Antennaria, Thymus, some varieties of arenarias, saxifragas, and sedums, to droop over and cling to the rustication. Even in the crevices of the rustication little Alpines are growing. So that instead of having outside our window, as is customary, a blaze of a few gay colours for a month or two, we have groups of upwards of fifty distinct plants —in fact, a vegetable microcosm—on which we can feast our eyes again and again all the year round with untiring interest, the subjects being all perfectly hardy, and as the soil is entirely closed the annoyance of having this dashed on the glass by every passing shower is avoided. In autumn, a few snowdrops and Scilla sibirica might be introduced."

HANGING BASKETS FOR DRAWING-ROOMS AND CONSERVATORIES.

IN antient Athens the suites of rooms were so planned as to be seen at once from the door of the *vestibulum*. The richly-painted walls, and the beautiful mosaic pavements of the hall, at once attracted notice. This was called the *atrium*. At the farther end of the *atrium*, opposite the *vestibulum*, was the *tablinum*, through which was seen the *peristylium*, which opened out through another room (the *oecus*) into a garden, remarkable for fonts or marble statues or painted walls. Within the peristylium, and suspended from its columns, were garlands of flowers ranged into a sort of gaudy display to make the drapery as prominent as possible. Vases of the most costly description, on the most appropriate pedestals, were employed for receiving the plants and flowers placed within

them, and the festoons formed garlands of beauty in keeping with the tastes of the age. In all this kind of flower adornment we have proof of the same desire of refinement as is attempted to be practised by the opulent in our times; and although we don't subscribe to the sort of "meretricious delusion" that was practised by those who had the management of decorating gardens and apartment,

Fig. 1.—Paxton Flower Basket.

we very much follow and improve upon, it is to be hoped, the leadership of antient Greece and Rome. We have something the same ideas of decorating vases, and standing them in vestibules and entrance halls; and we, too, like, and follow suit to the custom of festooning the arches that span our corridors, and drape down from the elaborate cornices that give character to our great and our little rooms as well. We, too, in the luxuriousness of our taste, erect fine piles of architecture, of wood and glass, as adjuncts to our withdrawing-rooms generally. The latter may be looked upon as a sort of modern peristylium, in respect of adornment, where richness in gilding, and elaborate patterns in stucco, and elegance in furnishing throughout, with as little order as possible in the placing of the moveables, reign supreme. Our improved climates prove suitable residences for a great host of plants of foreign climes; and thus the opulent individual can command a beautiful exterior, and with the aid of glass, intercept as little as possible the light of day. These plants yield leaves and

Fig. 2.—Paxton Conservatory Basket.

blossoms scarcely inferior to what they do in their native habitats. Personally we do not ape the glittering gorgeousness of eastern apparel, but we are not behind hand in robbing it of a portion of the most decorative of its flora. We are not contented, however, with plants, beautiful as they may be for their individual form, or colour, or blendings; we prefer to see elegant masses, contrasted for effect. We all like these—even the indiscriminate public look on with admiration—in our flower gardens, in our flower shows, in our greenhouses, and in our conservatories. Plants in pots are well enough, climbers are well enough, growing rankly over the iron tie-rods, and their branches hanging down grace-

fully in festoons, like the most elegant of drapery. But we have additional attractions now for commanding observation and admiration, and not the least of these is the system in vogue of growing plants in ornamental baskets.

The Paxton Drawing-room Hanging Basket (fig. 1) is of elegant design. It is made of wire, and its interior is lined with zinc, which can be renewed; it also has a drainage font. Some of the baskets are not provided with either of these fittings, which detract much from their usefulness. They require to be packed with sphagnum to keep the soil from getting washed through the interstices, and at best it is only a provisional wall. As the moisture and dryness fluctuate, the wall gives way and the soil tumbles out. Even the zinc is by no means a permanent wall of separation; in time it corrodes, and its place must be supplied, but it stands good for a long time. The importance of the drainage fonts is by no means inconsiderable. Superfluous water finds its way thitherwards, so that the roots of the plants can absorb what is necessary, and what is overplus is drained away. We have, then, as shewn, a receptacle of the most fitting kind for growing plants in a suspended position, good for the plants, elegant to look upon, and serviceable, because of easy transference to any position we may desire to decorate for the time being. It is cheap, too, to buy some of the most ornamental of them, not costing over a guinea; and if filled with bulbs and suitable plants, the whole thing, as seen in the engraving, could be had at a cost of a couple of guineas. In all cases it would be desirable to have the baskets in the conservatory until the blooming season, and then they could be transferred to, delight and astonish all city ladies and gentlemen; good, particularly, for birthday occasions, for weddings, and for contributing to the full cup of enjoyment on any particular festive occasion, when the were in blossom.

The Paxton Conservatory Wire H Basket (fig. 2) is such as is generally seen, with a variety of plants, in the d tion of conservatories. It has neith zinc lining nor the drainage font. Of this is less necessary in a conservatory water is periodically in use, and syringing plants and moistening tabl paths is the general order of the day. would not do at all where furnitur carpets were present; and hence B Sugden, to whom we are indebted for illustrations, have provided the more pletely equipped one, illustrated in The sample basket engraved is no suitable for bulb, but for general plar tivation. Ferns can be made to round about its surface to some pu The chaffy-rhizomed and linear-leave phobolus pertusus and N. rupestri admirable for this kind of decoration associate well with the variegated Pan These send their leafage now upwards, in a slanting, and now in a drooping pc and form the best sort of natural co to the globular mass, concealing muc is artificial about the outline. They ar fit associates for those plants that mo wards, and send their leaves forth in an ing position like the screw pines (Pand many of the Dracænas, some of the Cr and the more upright of the tall gr Indian ferns. These two baskets are had almost anywhere, at a very mo price, and might be used much generally in conservatory decoration th have ever been accustomed to see th troduced for such purposes.

This basket system is of so muc portance to villa gardens and villa gard that we shall return shortly to a fuller ment of the subject.

THE

COUNTRY GENTLEMAN'S MAGAZINE

MARCH 1871

LANDLORDS, TENANTS, AND CHAMBERS OF AGRICULTURE.

IF in all Chambers of Agriculture the same good sense was spoken as was uttered lately before the members of the Notts Chamber, their influence, we take it, would not be so inconsequential as it now avowedly is. The speaker was the Rev. C. Neville, of Thorne, himself a proprietor, and a man well-known and respected in the agricultural world.

Before referring to his admirable speech, we may remark upon some of the causes which have led, if not to the absolute failure, at least to the practical inefficacy of the Chambers, founded for the purpose of bringing landlords and tenants together upon a commom platform, where an interchange of opinions could take place frankly — unbiassed by the relative social positions each held—the tenant not cringing to the landlord, and the proprietor not putting on airs of condescension to the occupier. Some of the tenants very soon so far forgot themselves as to make use of anything like conciliatory or even civil language to proprietors; and proprietors in other Chambers —forgetful that as members thereof they stood on precisely the same footing as those who rented the land from them—tried to carry matters with too high a hand. And not getting all they wished to their mind, some of them petulantly resigned connexion with the organization to which they had given in their adhesion.

It was the view, as we have indicated, of those who bore the burden and heat of the day in the foundation of those institutions, which it was fondly hoped were calculated to smooth over all the difficulties existing between those who owned the soil and those who made it yield its increase—that in them mutual forbearance would be exercised, that good temper and common sense would prevail over passion and prejudice, and *principle* over any unjust exercise of power. And we believe this would have been the case had not outsiders come in, whose object was less the good of the farming community than popularity to, and aggrandizement of, themselves. There has been, or at all events it is generally supposed there has been, an endeavour to make a stalking-horse of the Chambers for purely personal and party ends, and the melancholy result of this supposition, whether founded upon falsehood or fact, is seen in the emaciated condition of some of the Chambers. The idea of the Chambers was undoubtedly good; we have means of knowing that it originated out of the best intentions on the part both of the landlords and the tenants who first gave to the suggestion

"A local habitation and a name."

But good ideas, like good horses (witness Lord Middleton's hunters recently) can be ridden to death by unskilled or injudicious riders; and this is what is being done with

the Chambers of Agriculture. The men at the wheel, or the men who assume to be at the wheel—and far be it from us to say that they are not good men and clever—do not somehow manage to keep the ship out of the way of the breakers.

"Youth at the helm, and pleasure at the prow,"

cannot account for the dubious steering of the vessel; for in youth, as Pitt said, there is no criminality, and we should fancy there is little pleasure in looking at your vessel careening without ability to save. The Central Chamber represents the men at the wheel, and the vessel seems to have become unmanageable. The digression is perhaps a little too long, but it will be pardoned on account of the truth embodied in it.

To return to the Rev. C. Neville's speech. We remark at first that it was not one of the kind we have complained of both landlords and tenants having made. It was one of the very sort which, in our opinion, Chambers of Agriculture were created to evoke. It was deliberate and dispassionate, recognizing the rights of the tenants, and taking care of the due privilege of the landlords. In Notts Chamber, in effect says Mr Neville, tenant and landlord meet upon the same footing. We are here to express our opinions candidly and openly in as strong a manner as we can, without being offensive; and abuse, as we all are aware, is rather a sign of weakness than strength. We come here for the purpose of convincing or being convinced—the tenants to state their grievances, and the landlords to redress them if they are proved to exist. Mr Neville, so far from having objected to the discussion of questions which have been objected to by some of his own class, and also some of the tenants, deplores that such an objection should ever arise. According to the report, he "considered it would be a great advantage if they could have all these subjects connected with the holding of land freely and fairly discussed between landlord and tenant. He was sorry that the landlords personally did not take more interest in Chambers of Agriculture. He thought that by not doing so they stood in their own light, and he regretted very much, as a class, they did not attend the meetings more."

The reasons why they do not so, and why the tenants, as a rule, do not turn out as they ought, we have indicated above.

Mr Neville views the relationship of landlord and tenant in its broad and only true light. The landlord is not serving his own interest when he is letting his land for the highest rent. The character and skill of the tenant ought to enter into consideration, and 25s. per acre from one might be better than 30s. per acre from another. The landlord might think that the proceeds from game sent up to the Leadenhall Market were a nice little bit of pocket money, but the profit is altogether unprofitable if it is obtained through overrunning and ruining his tenant's farm by excessive preservation of game. "A landlord who preserves a great deal of game to the injury of his tenant, might go on for a time and not feel it, but, in the long run, he must suffer severely in two ways. It was impossible that any tenant would give the same rent for land that was overrun with game, as he would for land on which the game was kept down in moderate proportion." We have no doubt, with Mr Neville, that the landlord does injure himself incalculably in more ways than one by the over-preservation of game, but we are afraid the tenant sometimes cannot help himself, and is compelled to tender and toll down the high rent.

Mr Neville, we are glad to see, strongly supports leases, and on the soundest of grounds. He says, "it has been said that a good landlord is the best security. There may be some weight in the argument, but they must remember that if they had a good landlord they did not know what the next might be, and as far as that went, the security might terminate by the breaking of a railway spring." Mr Neville's speech altogether—which we are glad to notice from the *Nottingham Guardian's* report, met with a hearty response from his audience—we heartily commend to our readers.

GAME LEGISLATION.

WE have never gone in with fiery orators upon the Game-laws, and never thought that these laws ought to have been the cause of so much heartburning as they have been. The evils arising out of the way in which these laws were administered, were certainly very great, and the destruction occasioned by over-preservation of game very grievous indeed; but the cry for a total repeal often appeared to us to arise from mere political considerations, rather than from a desire to promote the well-being of farmers. The passionate declamation which has been common to many of those who took an active part in the agitation against the laws was, and indeed seemed purposely intended, to foster mutual dislike, instead of kindliness, between tenant and landlord—to stretch asunder, rather than draw closer, the bonds which ought to unite the occupier to the owner of the soil.

We are glad to see that the tone in all discusssion upon the Game-laws has been much modified of late, that the taunts of oppression against landlords are fewer and less fierce, and that the poacher is not held up so much as a martyr to tyrannical arrangements as he was. It seems to be recognized now that the total abolition of the Game-laws would not be attended with such splendid results as, years ago, was stated would arise from the repeal; that the prowling poacher would not be the sweet, lovable, and profitable companion he was at one time painted; that, in fact, it was not at all unlikely that while "potting" the pheasants of the landlord, he might also pocket the poultry of the tenant.

Another thing has come to be seen, and it is a wonder it was not sooner thought of and made more a matter of consideration, viz.—that the question of game, to a great extent, is a matter of arrangement between owner and occupier, and that legislation which asked too much might fail in securing anything. If a landlord wished to shoot the winged and wild creatures on his estate, and had so arranged before-hand by agreement with the tenant, it would be a hard matter if the law should step in and hinder him from having his sport, and the tenant from implementing the engagement to which he had put his signature.

Of the great hardships the tenants on many estates suffer from the over-preservation of game, every reader of the newspapers is painfully aware; and it is to be regretted, that when the devastation of crops is pointed out to some owners of the soil they do nothing to remedy the evil. When a man takes a farm with comparatively a small quantity of game upon it, on a long lease, he naturally feels aggrieved at the losses he sustains by vermin, despite his agreement to protect the game. It is, we believe, more on account of this obvious breaking of the spirit of the arrangement by landlords that so much loud and angry outcry has been raised against the Game-laws, and so much ill-feeling engendered against game preservers. There are very few farmers, indeed, who, even if they do not care for the gun themselves, would like to see their landlords deprived of a day's sport. They would gladly welcome them on their farms, and take care also that a fair day's shooting would be obtained.

Some such notions as these appear to be permeating the mass of the intelligent farmers of the country. They are no longer led away by excited orators, to clamour for a total repeal of the Game-laws, which, if not unreasonable, they admit is at all events inexpedient at the present time.

In the Midland Farmers' Club, the eloquent oratory of a well-known agitator on the question failed to ensure the passing of a resolution hotly denouncing the Game-laws, and asking for their total abolition. After a discussion, in which moderation was the leading feature, and where there was evidently a desire to secure justice to themselves, with-

out abuse of, or detriment to, those over them, the farmers of the Midlands passed the following amendment instead :—"That whilst this Club disapproves of the total abolition of the Game-laws, it is most anxious to record its opinion that the over-preservation of game is a most serious national evil, and that the sooner hares and rabbits are struck out of the Game-laws the better."

This seems to us a very sensible compromise, and one which we believe will be readily accepted by the landlords. Indeed, many of them have already made such a concession to their tenantry without the interference of the Legislature; and we are of opinion that not a few of them will lend their aid in Parliament to secure that such an arrangement will become law.

At an influential meeting of the Scottish Chamber of Agriculture held lately, resolutions of a similar character were arrived at. They were as follows :—"1. That the legislative reform now to be sought should be confined to hares and rabbits. 2. That hares and rabbits should be dealt with by removing them from the game list, and giving the occupier of the land the joint right with the landlord to kill the hares and rabbits on the land occupied by him, and that the tenant's right shall be inalienable, and be exercised by any one having the tenant's authority."

It will be remembered that some very hot discussions have taken place in this Chamber, and that even the Committee appointed to confer with the Lord Advocate upon this subject, did not cohere. It is gratifying, therefore, to find that the members of the Chamber have arrived at something definite at length. It is true, that in neither the Midland Farmers' Club nor in the Scottish Chamber was there perfect unanimity, that is seldom secured about anything—but there was sufficient on the side of the motions carried to shew that such a measure would be accepted as satisfactory by the majority of farmers. And being so very moderate, it ought to secure the cordial assent of the landlords.

DIRECT TAXATION ON PROPERTY AND INCOME.

MR DUDLEY BAXTER, M.A., recently read, before the Statistical Society, at their rooms in St James Square, London, a paper entitled "Direct Taxation on Property and Income." Mr W. Newmarch, the President of the Society, was in the chair.

Mr BAXTER briefly passed in review the chief sources of income—land, buildings, railways and works, movables, industry (which, he remarked, exceeded them all in annual revenue, and in which were engaged millions of men, the reward of whose intelligence and labour amounted, in its yearly aggregate, to hundreds of millions sterling), mortgages, and foreign investments. Then, in order to present a clear view of the direct taxation of this wealth, he said it was necessary first of all to ascertain, with some degree of approximation, the annual value of each of the different classes of property and income, and therefore he entered upon a wide field of arithmetical calculations.

PRINCIPLES OF DIRECT TAXATION.

Constituting these figures the basis of his subsequent arguments, he proceeded to examine the principles applicable to direct taxation. The wages of the working-classes he would exempt without hesitation, but in regard to larger incomes he considered that all property enjoyed by the antient grant of the State, such as land, or by the protection of the State, such as personalty and earnings, ought to contribute equally towards the necessities of the State. Still, industrial incomes were entitled, as proposed by Mr Mill, to pay one-fourth less taxation than personalty, as an allowance for savings and insurance. Land,

houses, and works, he contended, stood in a similar position. The annual value of each consisted of two portions—the ground rent and a large construction or improvement rent. To distinguish between the assessments of these two portions was a difficulty which went to prove that equality of taxation for every kind of property was the soundest both in principle and practice. Having glanced at the development of the present system of direct taxes by reference to history so far back as the Saxon period, when absolute ownership of land free of rent and service was recognized, he shewed that the taxes on land and movable personalty was very nearly equal, and that both were taxed three times as much as industrial incomes.

IRREGULARITY AND WRONG OF DIRECT TAXATION.

Next he adverted to the local taxation, and concluded as follows:—"Every one will agree that the present system of direct taxation, both imperial and local, is very irregular and anomalous, and requires consolidation and reform. As regards Imperial taxes, what can be more absurd than the treatment of leasehold property, which is subjected to double taxation, both as real estate and as personalty? What more anomalous than the law that personal property passing by will, pays probate duty, while personal property, entirely in the same position as regards other taxes, but passing by settlement, pays none. As regards local rates, what can be wider and more irregular than the whole system of their imposition and administration? Would that we could adopt some broad view and comprehensive arrangement that would introduce uniformity and equality into our present capricious and unsystematic system! Every one will, I think, also agree that it would be a good thing to relieve the dwellings of the poor from bearing so much of the burden of maintenance of the poor. This is desirable in a sanitary point of view, and for improvement of the health of the people. But further, we ought to do something to remove a portion of the great inequality that exists between the burdens of real property and personalty, and still more as compared with earnings. Why should land pay 15½ per cent. of direct taxation, and houses 14½ per cent., or 11 per cent., according as they are leasehold or freehold, when personalty only pays 8⅔ per cent., and earnings 2½? It is an excess beyond all reasonable proportion. If we add the effect of mortgages it becomes more disproportionate still. The disproportion has gradually grown up, and is constantly growing larger still. Two per cent. was added in 1853 by the Succession Duties. One per cent. is now being added by the transfer of the turnpike roads. The threepenny Education rate will add 1 per cent. more. I maintain that it is an economical mistake to load exceptional taxation on any kind of property. It is unjust and it is also unwise. It prevents the circulation of capital. It discourages improvements. It hinders the land from increasing its production, and so inflicts an absolute injury on the nation. But it also discourages and hinders the poor man from acquiring a house or a piece of land. I should like to see peasant proprietors, every man, saving money to buy his own house and his own rood of land. I want to lighten the burdens that deter them, not to heap on new burdens to prevent them." As to measures of relief, he asked, "Why should we continue two distinct valuations, one for rating purposes, with fair deductions for repairs and expenses, the other for income-tax, without any deductions at all? Why should not both be consolidated into the poor-rate valuation? I think that both householders and landowners are entitled to demand this of Mr Gladstone, and that they should no longer be so exceptionally taxed, as he himself has shewn, in their payment to income tax. Why should not also the other schedules of the income tax contribute their quota towards the poor? We have instituted a common fund for London, out of which certain common expenses are paid, and the cost of indoor relief. Extend the principle to the whole kingdom, and let Schedules C and E, and the unrated portion of Schedule D.

supply such a common fund, and bear this portion of the expense. I am persuaded that we must have larger recourse to rates on real property, as the oldest and most equitable tax, in place of partial burdens on limited classes of property, and that we must endeavour to lessen the anomaly and injustice of charging £12,000,000 of rates solely upon net income of £93,000,000 out of the £390,000,000 of property and income liable to income-tax in England and Wales, and of distributing the total £30,000,000 of direct taxation of England in these absurd proportions—3½ millions on £145,000,000 income from earnings; 10½ millions on £152,000,000 income of personal property; and 15½ millions on £93,000,000 net income of real property.

CAN AN EDUCATED MAN GET A LIVING BY FARMING?

AN educated man cannot make a living by mere manual labour, either on a farm, in the blacksmith shop, or in the factory. He may do more work in an hour or in a day and do it better than the uneducated man by his side. A man with brains, other things being equal, can pitch more hay, or dig more rods of ditch in a day, than the mere man of muscle. But what of it? The uneducated man can perhaps earn 1½ dollar per day, and the educated man, from his superior skill, can do one-third more work and earn 2 dollars per day. But will extra 50 cents a-day pay him for his years of hard study and self-denial? Will 2 dollars a-day go as far in providing the luxuries and necessaries of life for himself and his family, as the 1½ dollar will in the other case? Will it enable him to educate his family as well as he himself has been educated?

An educated man, to get a living by farming, must do work that an ignorant man cannot perform. On an ordinary sized farm, and with ordinary farm-men, he will find no lack of employment—or if he does, he must change his system of farming, and go into some of the higher branches of agriculture or horticulture. No matter how thoroughly educated he may be, work he must, and work hard too—self-denying work, "honest work," as Carlyle says, "which you intend getting done," and then go at something else. This is the secret of success in all undertakings. There are a good many educated men who, having made money in other pursuits, turn their attention to farming. We wish there were more such. We extend to them a right hearty welcome. But, as a general rule, they will not make farming pay. It is not the business of their lives. It is not work; it is recreation—and they should expect to pay for it, as they would for any other amusement. We know a lawyer—one of the ablest in the State—who has retired on to a farm. He makes a capital good farmer—has the neatest and cleanest farm in the neighbourhood. He also takes real delight in spreading manure, feeding his stock, and digging and laying underdrains. He works harder than any other man on the farm. But it is not work to him, any more than rowing is work to the Harvard Club. Some time since, a wealthy New York merchant wished to consult him on a legal question of great importance. He went to the house and was told that the "judge" was out on the farm. Going to look for him, he found an old man digging out an underdrain that had got stopped up. He inquired for the judge, and was told that he would be there in a few minutes. He concluded to wait. The man kept on throwing out the mud. "Dirty work," remarked the kid-gloved merchant, as he stood on the side of the ditch in his patent leather boots. "How much does the judge pay you a-day?" "I have taken it by the job," was the reply, "and

shall not make my board." It was the judge himself, and he undoubtedly told the truth. Hard as he works, and skilful a ditcher as he certainly is, he nevertheless cannot make his board in digging underdrains. This noble old veteran of the bar and the bench spent the next day in writing an opinion that was worth more money to the merchant than it would cost to drain the judge's whole farm. This was *work*, and would command its price; digging ditches was play to the old judge, and was paid accordingly—paid in restored health and in command of vigour of mind and body. But it would not pay his board.

The educated farmer must do precisely as other successful men do. He must not spend his time in doing things that he *likes* to do. He must exercise self-denial. Because he likes to chop, it will not do to leave the care of the stock to Patrick, while he goes to the woods and "puts up" his two cords and then spend the evening with his neighbours, boasting how much work he has done that day. In fact, he has not *worked* at all. Had he stayed at home and attended to his stock, and done other things which he did not like to do, but which were necessary to be done, and which Patrick could not do, then he would have worked, and would sooner or later have got his reward.

Amateur farmers, notoriously, do not make a living by farming. And yet many of them are thoroughly educated men, and not a few *know* far more of the theory and practice of agriculture than their successful neighbours. Their failure is usually attributed to their employing too many men, and in not "getting the work out of them." There is some truth in this; but we have known an eminent successful contractor on a railroad, who owed his success to his energy and to his ability to manage men, utterly fail in making farming pay. And in his case, at least, the cause was not in his ignorance of general agriculture, or in his employing too many men, or in his inability to get the work out of them: it was due principally to his neglecting the little details of farming. He was inclined to do things on a large scale, and he made the mistake of going into the raising of those crops which require minute attention, and this he neglected to bestow. He would have done better had he confined himself to some one or two leading crops, such as wheat, corn, or potatoes, but he thought the profits not large enough.—*Hearth and Home.*

A PHILOSOPHER OF THE FARM.

THE pleasure of farming, and the inestimable benefits which the farmer confers upon the human race, are ably and beautifully set forth by Ralph Waldo Emerson, in the following passage in one of his "Essays":—

"The glory of the farmer is, that, in the division of labour, it is his part to create. All trade rests at last on his primitive authority. He stands close to nature; he obtains from the earth, the bread and the meat. The food which was not, he causes to be. The first farmer was the first man, and all historic nobility rests on possession and use of land. Men do not like hard work, but every man has an exceptional respect for tillage, and the feeling that this is the original calling of his race, that he himself is only excused from it by some circumstance which made him delegate it for a time to other hands. If he had not some skill which recommends him to the farmer, some product for which the farmer will give him corn, he must himself return into his due place among the planters. And the profession has in all eyes its antient charm as standing nearest to God, the first cause. Then the beauty of nature, the tranquility and innocence of the countryman, his

independence, and his pleasing arts—the care of bees, of poultry, of sheep, of cows, the dairy, the care of hay, of fruits, of orchards and forests, and the reaction of these on the workman in giving him a strength and plain dignity, like the face and manners of nature—all men acknowledge. All men keep the farm in reserve as an asylum, where, in case of mischance, to hide their property, or a solitude if they do not succeed in society. And who knows how many glances of remorse are turned this way from the bankrupts of trade, from mortified pleaders in courts and senates, or from the victims of idleness and pleasure! Poisoned by town life and town vices, the sufferer resolves:—'Well, my children, whom I have injured, shall go back to the land, to be recruited and cured by that which should have been my nursery, and now shall be their hospital.'

"The farmer has grave trusts confided to him. In the great household of nature, the farmer stands at the door of the bread-room and weighs to each his load. It is for him to say whether men shall marry or not. Every marriage, and the number of births, are indissolubly connected with the abundance of food; or, as Burke said, 'man breeds at the mouth.' Then he is the Board of Quarantine. The farmer is the hoarded capital of health, as he is also the capital of wealth, and it is from him that the health and the power, moral and intellectual, of the cities come. The city is always recruited from the country. The men in cities who are the centres of energy, the driving-wheels of trade, politics, or practical arts, and the women of beauty and genius, are the children or grandchildren of farmers, and are spending the energies which their fathers' hardy, silent life accumulated in frosty furrows, in poverty, necessity, and darkness. In English factories, the boy who watches the loom, to tie the threads when the wheel stops, to indicate that the thread is broken, is called a *minder*. And in this great factory of our Copernican globe, shifting its slides, rotating its constellations, times and tides; bringing now the day of planting, then of watering, then of weeding, then reaping, then of curing and storing—the farmer is the *minder*. His machine is of colossal proportions; the diameter of the water-wheel, the arms of the levers, the power of the battery, are out of all mechanic measure; and it takes him long to understand its parts and its working. This pump never 'sucks;' these screws are never loose; this machine is never out of gear; the vat and piston-wheels and tires never wear out, but are self-repairing. We see the farmer with pleasure and respect, when we think what powers and utilities are so meekly worn. He knows every secret of labour. He changes the face of the landscape. Put him on a new planet, and he would know where to begin; yet there is no arrogance in his bearing, but a perfect gentleness. The farmer stands well on the world. Plain in manners as in dress, he would not shine in palaces; he is absolutely unknown and inadmissible therein. Living or dying he never shall be heard of in them. Yet the drawing-room heroes put down beside him would shrivel in his presence—the solid and unexpressive, they expressed to gold leaf. But he stands well on the world, as Adam did, as an Indian does, as Homer's heroes, Agamemnon and Achilles, do. He is a person whom a poet of any clime—Milton or Cervantes—would appreciate, as being really a piece of the old nature, comparable to sun and moon, rainbow and flood; because he is, as all natural persons are, representative of nature as much as these. That uncorrupted behaviour which we admire in animals and in young children belongs to him, to the hunter, the sailor—the man who lives in the presence of nature. Cities force growth, and make men talkative and entertaining, but they make them artificial. What possesses interest for us is the natural part of each, its constitutional excellence. This is for ever a surprise, engaging and lovely; we cannot be satiated with knowing it, and about it, and it is this which the conversation with nature cherishes and guards."

ADULTERATION OF SEEDS—A NEW DODGE.

[E proverbial feat of driving a coach-
and-six through an Act of Parliament
in a fair way of being exemplified in
to the "Adulteration of Seeds Act"
69. Farmers must, therefore, look
and make a more careful use of their
ıan many of them have hitherto done
purchasing seed, especially that of
:lover.

›py of "The Seed Adulteration Act"
›peared in THE COUNTRY GENTLE-
MAGAZINE, and those who have bound
will see that the only systems of
ation contemplated and provided
by its provisions, are the mixing
'd, killed, or dyed seeds. But it seems
have occurred, in the concocting
: Bill, that other modes of adul-
n were known to, and practised by ex-
in the art, although *sanded* samples
ever imitations in paste were previ-
n the market. Sanding the sugar is
reputed trick of the grocers, and it is
clumsy as well as easily detected one,
e Legislature seems to have thought
›lication to seeds as undeserving of

Or it might be that they deemed its
ıention would imply an insult to the in-
ıce of practical agriculturists, and so be
o bring their Act into ridicule. It is a
›wever, that they did not include in the
the words, "or other articles."

: seed adulteration with sand is now
ingeniously, and increasingly practised,
of no doubt; for we last spring saw
samples of white clover seed from
ıy which had been mixed, to the extent
ten to fifteen per cent., with prepared
ıctored" sand. And we were lately
ɜamples of coloured sand which had
›rwarded from the Continent to an
*r*e dealer at a northern sea-port, accom-
by a letter, of which the following is
:—

lemen,—I beg to offer you, as per enclosed pat-tern, about 300 cwt. sand, used for mixing clover seed at the very low price of 10s. 6d. per cwt., bag included, f.o.b. here, cash by handing bill of lading.

"I make a large business there into England, and as I suppose you want it also, I shall be glad to receive your kind orders.

"Delivery could be effected about four to five weeks after ordering. You can receive the sand also in other colours, for white and red seed. Waiting your answer, —I am, gentlemen, yours respectfully."

We, in the meantime, withhold the writer's name and address, the publication of which would only be advertising his abominable wares gratuitously.

Now, here is an easy way of making large profits, which dealers with less principle than the firm to whom we are indebted for these particulars, might have grasped, after soothing their consciences by the argument, that as "a large business" seems to be done "therein to England," why should we not have a share, seeing that in all likelihood if we don't accept the offer, others will, &c. The samples alluded to were one for red clover seed, another for white clover seed of first quality, and a third for white clover of second quality. That for the red clover has but little of the fine colouring which belongs to good samples, and resembles, in this respect, seeds which have not been perfectly ripened. The first quality of white clover imitation is perfect in colour; and the difference in shade between that and the middle quality has been most artistically imitated in the latter. All are unobjectionable in size, this having seemingly been attained by sifting to the proper guage, but here the likeness ends; for although not very evident except to a good eye, an ordinary pocket microscope unmistakeably reveals the angular cleavage of the quartz grains, somewhat rubbed or rounded by attrition. On putting a little of the white clover sand in a small phial among clean water, a yellow tinge was soon imparted to the latter, which after two or three hours

aided by a frequent shaking, became much deepened in colour, although scarcely any perceptible change had taken place in that of the sand. This is a good mode for testing any artificially coloured seed—as well as for ascertaining the presence of that smart American invention, imitations in paste. Another test for detecting the proportion of sand in a sample, is to stir or shake the seed in a vessel of water, when the quartz or sand will be seen to fall fast to the bottom, and a few repetitions of the operation, if dexterously performed, will leave the sand alone, as the seeds being lighter are poured off with the water. Trying to chew a few seeds is also a ready mode of ascertaining whether they are mixed with sand, as all know the disagreeable sensation sand produces when caught between the teeth.

Clover seeds of all kinds are unusually scarce and high priced this season. English red being worth, in the trade, from 90s. to 100s. per cwt. German from 70s. to 80s., and American about 64s. White clover, of first quality, 90s., and of middle quality, 80s.; while Alsike or hybrid clover ranges from 120s. to 145s. Compare these rates with "the very low price of 10s. 6d. per cwt." for the coloured sand imitations, and it will be seen that the firm to whom the offer was made, might have netted, had they gone into the transaction, over £1000 sterling out of the pockets of too confiding buyers, who, although the principal, are not the only sufferers by such fraudulent doings. The honest dealers are also losers in consequence of the less scrupulous being thus enabled to undersell them in the market. And neither class of sufferers will readily acquiesce in the opinion promulgated at a preliminary meeting of the Seed Bill Promoters, by no less an authority than the Right Honourable John Bright, as President of the Board of Trade, to the effect that "adulteration was merely another, and not a very reprehensible, form of competition in business." This is a doctrine, allowing it to be partly admissible when all concerned are aware of the extent of adulteration present, is certainly unsound when applied to retail or other purchasers of seed who are ignorant of the extent to which these have been adulterated, or *reduced*, to use the conventional trade term.

In connexion with seed adulteration, we have lately heard rumours of a large quantity of Rubsen seed being in the market at sufficiently high prices to render its employment for crushing or other purposes, save that of turnip-seed adulteration, unlikely. If thus applied, however, those so using it render themselves liable, on discovery, to be dealt with by fine and exposure, as the Act directs, and we sincerely hope that they may not escape its penalties.

FEEING FAIRS.

IT is something sad to find that the strong representations that have from time to time been made regarding the evils of Feeing Markets have been productive of such a paucity of good results. In many ways these markets are unmitigated nuisances. In almost no way, as far as we can judge, is there any advantage to be derived from them. It is true the agriculturist, at the Feeing Fair, sees the "article" he is about to engage; but can a man's character for integrity or industry be told from his personal appearance? In the case of women it is almost unnecessary to put the question. Then it is asserted that it is only at the Fair the farmer can truthfully find what are the actual wages being paid by his neighbours; but the law of supply and demand would soon settle that point. Besides, the Register Office system enables the employer to find, in positively an easier and more correct manner, the state of the labour

, while by its adoption the debasing which are so often to be witnessed ng Fairs would be altogether avoided. ny, again, it is urged that, by the n of the Feeing Fairs, the servants be deprived of their holiday; but no real necessity for such a deprivaServants could, with advantage to lves as well as to their employers, eir half-yearly holiday without taking the carousals and immoralities that so tly characterize the proceedings at airs.

ıe last meeting of the Royal Northern , it was resolved to issue a representathe subject of the engagement of farm s. In that document we cannot but he presence of a remark that militates the alleged increasing intelligence of .t body of northern agriculturists. "It ppointing to find that masters are o avail themselves of the use of such [Register Offices] than servants." We ly afraid there is some reason for this on of disappointment. Doubtless, like every other class of people, agriculturists are not very apt to hurriedly make a change in their manners or customs. But the readiness with which almost the entire body have adopted numerous important changes in stocking and cropping during the last five-and-twenty years, leads us to the conviction that ere long farmers will see it to be to their decided advantage to engage their servants by means of Registry Offices. Of course, a necessarily strict system of "characters" would require to come into fashion, and by this means the putting of round men into square holes would be avoided. At present the continual-change system is not only annoying but expensive. A farmer must try a servant for at least six months, when long ere even that brief period has elapsed, the master has found that the servant is worthless, or the servant that the master or the work will not suit him. With a Registry Certificate of his age, and even his height, and a list of his qualifications from his last employer, only the sort of servant that the farmer wanted would be engaged by him, and, in the end, fewer changes and less dissatisfaction would be the result.

TAXATION OF MILK CART HORSES.

'ER all the discussion which has taken ɔlace on the subject, there appears to great dubiety about the taxation of mployed by farmers. The definition ıls entitled to exemption are far from xplicit, and the decisions given in ave been anything but consistent. In :e one man gets off free, in another he ted under precisely similar circum-

A farmer's horse employed in carry- into a town, is, by one set of justices, l to be liable; by another it is held that nal is necessary for the purposes of ıess of the farmer, and therefore justly from the license.

those giving the various decisions cely blameable;—for the information afforded by the Exchequer to numerous anxious inquirers, is not at all easy of understanding. In a letter from the Chancellor, in June, it would appear that milk cart horses were liable to pay duty. The letter stated in effect, that the Chancellor of the Exchequer, after careful consideration of the question as to the liability of milk-farmers to horse duty, had come to the conclusion that they were liable to be fined if they did not take out the license. So long, the letter went on to say, "as a farmer confines himself to carrying his produce to market, he is clearly within the limits of his vocation as a farmer; but when he retails his produce from house to house, it must be held that he assumes the character of a

trader, and has no more claim to exemption than the man who retails milk which he purchases wholesale from a dairyman." Now, this letter does seem clear enough, but it has been followed by other communications on the same subject, and explanations, which scarcely appear in consistence with the above. The result is, that decisions have been given sometimes in favour of the Inland Revenue, and sometimes against it, and the matter remains in a very unsettled condition.

A case in which the decision went in favour of the farmer, who resides in the neighbourhood of Burnley, came, on appeal by an officer of Inland Revenue, before the Preston Quarter Sessions recently held. Mr Hartley, it appeared from the evidence given, farmed 156 acres of land, upon which he kept fifty cows, and was in the habit of sending his milk into the town, where he disposed of it to regular customers. He did not hawk it about from door to door, but only delivered it to those whom he knew wanted it. It was contended, therefore, that such being the case he was fairly entitled to exemption, that the carrying of milk into the town was as much a legitimate part of the husbandman's occupation as the carting of turnips or straw. For the Board of Inland Revenue it was maintained that, to all intents and purposes, the milk being delivered from door to door was essentially the same as hawking it; that being so sold, the horse ought to be assessed just the same as that of the man who purchased his milk from the producer and then drove through the streets with it. Had the milk been delivered in bulk to one customer, then exemption might have been claimed, but it could not be allowed under the circumstances detailed. The Bench, however, held, with the lower Court, from whence the appeal had been made, that the conveyance of milk to the market might be allowed to come fairly within the scope of the husbandman's business; they dismissed the appeal, and refused an application to allow the case to be made a Court of Exchequer one, on the ground that they did not think it was a proper one for that Court, in which costs would not be allowed to the respondent.

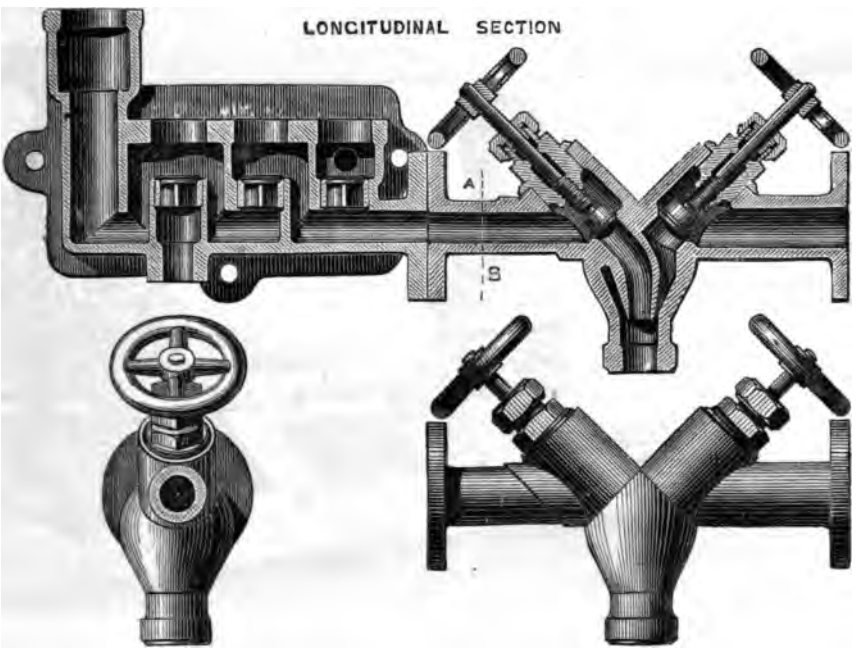
Now, while we are glad to notice that exemption has been granted in this case—because we do not think that a man in such a position as this farmer ought to be so taxed—we cannot, in the face of the Chancellor of the Exchequer's letter, quoted above, see how the justices could arrive at the decision they did, unless, indeed, in doing so, they endeavoured to make a compromise between this statement of the Chancellor's, and others that have since been published by his authority.

It is a question of very great importance, as the counsel for the appellant said, because there were a great many others precisely in the same position as the respondent who had paid their share of the taxes; and it was not fair for them to bear burdens from which their neighbours are freed. There are others, too, whom we have no doubt have not yet paid, who will look to this decision as a precedent for their avoiding the assessment. It would be well, therefore, if, once for all, we could have a concise and intelligible statement drawn up as to the conditions under which farmers' horses are liable. It is not pleasant to see law so varyingly administered.

Agricultural Engineering.

GARRETT & SONS' WATER HEATER.

THIS is a very ingenious, yet simple invention for supplying water in a heated state to boilers, thus saving a great deal of expense in fuel. The drawing which we give, illustrates one of these handy water-heaters. The longitudinal section shews the feed pump of an ordinary steam-engine. The connexion to the suction pipe through which the exhaust pipe of the engine, the steam having free egress into the funnel or the open air in the usual way. The connexion to the pipe through which the water is returned to the cistern or reservoir, is seen to the right. The quantity of water to be passed through the water-heater is regulated by the valve on the left; that on



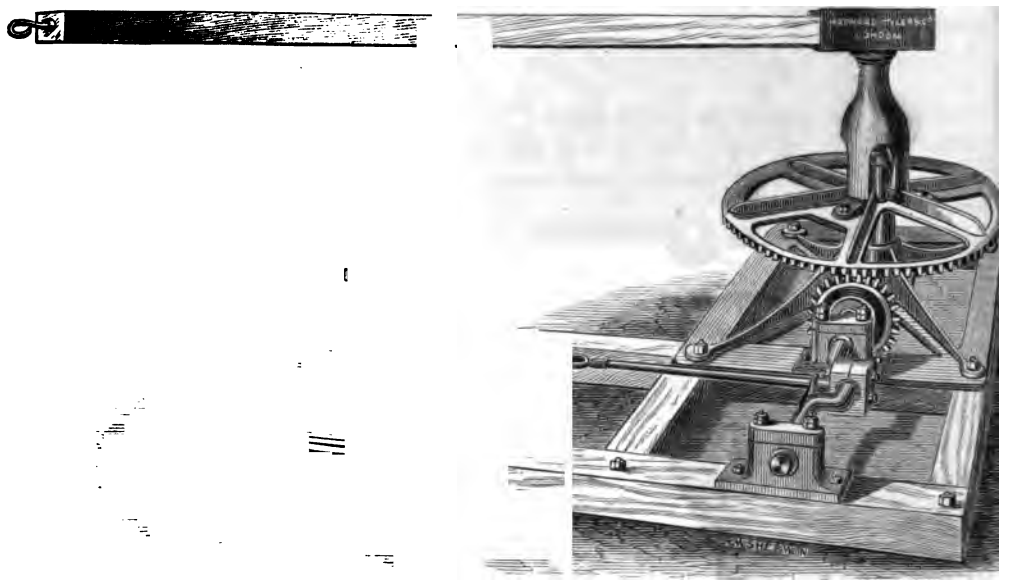
Garrett & Son' Water Heater.

the water is drawn from the cistern or reservoir to the feed pump is seen, also the admission, and retaining; and check and pressure valves. The other and darker coloured portion of the woodcut exhibits the new water-heating apparatus. The flange in the centre is connected by wrought iron to the right, determining the quantity of steam to be drawn from the exhaust pipe by the current of water through the nozzle. While the apparatus is in use, the pump is kept continually serving, and the left-hand valve may be so adjusted as to enable the pump, at every stroke, to supply the boiler,

through the check valve, with a certain amount of heated water, and then return the remainder through the nozzle. It then comes in contact with a portion of the exhaust steam, and is passed at an increased temperature into the cistern from which it was originally drawn by the feed pump. The engraving shews this plainly.

HAYWARD & TYLER'S HORSE PUMPING GEAR.

THE engraving represents a very compact and excellent arrangement of horse-power for surface-pumping, manufactured by Messrs Hayward, Tyler, & Co., Upper Whitecross Street, London. A light horse wheel is attached by means of a crank to a double-acting pump, on the California principle, the whole being fastened to a to put up a set of machinery at each place. The compactness and cheapness of the arrangement have induced many to adopt it as a fixture, in various places, among which we may mention the gardens of the Hon. Locke King, at Weybridge. The pump is double-acting, and of a construction which throws the water with great force. As



Hayward & Tyler's Horse Pumping Gear.

wooden frame. It is so constructed that the wooden frame forms all the foundation required, and it may be moved about complete in a cart, and put down anywhere where pumping has to be performed. This will prove a convenience to many farmers, and others, who require occasional pumping at different parts of their land, and do not wish the valves and working parts are reached in a few moments by simply loosening two swing bolts, so that even if the pump is choked by pumping sewage, &c., it is easily rectified by any inexperienced man. We may mention that the arrangement now adopted is still more compact than that shewn in the drawing.

The Farm.

THE ROUGH-LEAVED COMFREY AS A SOILING CROP.

HE rough-leaved Comfrey (Symphytum Asperrinum) is a native of the sian Mountains, and introduced from e to Britain in 1799, and is perfectly in Ireland, where, for many years, engaged the attention of the most tened agriculturists, as a valuable or soiling plant. It was extencultivated by the late Bishop of re, in a field at Glasnevin, still called omfrey field, where the plant is still , growing up as a persistent weed, in of every attempt to eradicate it, and growing from the seed shed along athways in that neighbourhood. Dr izy introduced the plant into the county ow, many years ago, and, from his exice, strongly recommended it to the r farmers for house-feeding their cows, lso pigs. Its ordinary produce has estimated, by practical farmers, at 30 per acre, but in experiments made on w Castle farm, on a considerable scale, ounted to 82 tons per Irish acre, in separate cuttings of 28½ tons in the le of April, 31 tons in the middle of and 22½ tons in the middle of Septem-

e late Rev. Mr Townsend, of Aghada, y Cork, was an enthusiastic cultivator plant for many years, wrote practically e subject, and continued its cultivation ale of plants, at a moderate price per ed, up to the period of his demise; and ve forwarded plants to a gentleman, in eighbourhood of Liverpool, some years who profitably cultivated the crop. It ily propagated by offsets, or cuttings of ots, and, being a perennial plant, when established, produces enormous crops, at renewal for many years. Pigs prefer it to almost all other plants; cows and sheep devour it ravenously, and it does not produce hove in either, like clover or other succulent food; and does not communicate any bad flavour to cows' milk or butter. The plant belongs to the Forage family, and, like most of its congeners, is cooling and mucilaginous. Very many gentlemen, after the example of the Bishop of Kildare, who was a first-class dairy farmer, cultivated it in their villa or suburban farms around Dublin, for their dairy farms, and, in fact, we do not know of a more useful and less troublesome plant, when once established, for cow-feeding. The plant will thrive in any poor, dry, exposed soils; but, to gain the most profit from it, it should be planted in a deep, rich, and friable soil; and will well repay a liberal manuring; and it yields an abundant and constant produce for a long series of years, if liberally treated. It is not suited for any rotation of cropping, but must be cultivated as a permanent crop, like furze or lucern. It grows, when let alone, to several feet in height, but should be cut for use before it flowers. Although, at Carnew Castle, it was cut but three times in the season, we have cut it four times, with the best results, as green fodder. In making plantations of the rough Comfrey, the roots may be taken up any time from October to April; but February and March is the best time, cut into small pieces, as the smallest bit will produce a plant, and planted in clean, deep, rich soil, in rows, 2 feet to 2½ feet apart, and 15 to 18 inches apart in the rows. The after culture consists in keeping the crop clean with the horse or hand-hoe. If the plantation is made early, before the dry and cutting winds of April come on, so that the cuttings may begin to strike root and get established, and the soil rich enough, it will

yield two good cuttings the first season; and every year after, by manuring and grubbing between the rows in the latter end of October, it will yield three to four cuttings, according to the quality of the ground, and the care bestowed on it. Though it was first introduced into England, and engaged the attention of agriculturists as a valuable forage-plant, in the neighbourhood of Lewisham, it never gained a footing amongst English farmers; and to Ireland is due the credit of all that is known as to its cultivation and great value as a summer forage-crop. Pigs revel on it, and prefer it to vetches; and cows and sheep, as already said, eat it with avidity, without incurring any danger from hove; and between it for use in the summer season, and furze in the winter, with a few roots of mangold, and a little chaffed hay and straw, in the latter season, cows can be abundantly and profitably maintained the whole year round. —*Irish Sportsman.*

SUBSOILING PREVENTATIVE OF DROUGHT.

THAT is, get up the soil from below the present working soil, and till that. It is there in most cases, and can readily be used, dropping the soil now in the daylight, into the dark below. This will give you a mellow subsoil, porous, what is wanted in our droughty seasons. This deepens the land, that materially doubles the depth, and the subsoil plough may be used with the greatest ease and the finest effect. The whole operation is almost equivalent to drainage, in some cases superior (where the soil is but slightly overmoist); only it does not discharge water, but greatly adds to the growth of grain and the withstanding a drought.

How are we to get such a deep soil? In other words, how are we to bring up this farm? It is a very nice question, and a very heavy load to raise; you would be surprised were you to see the figures upon it. Of course it is to be raised by the plough. There are so many different kinds of ploughs now-a-days, that it is not difficult to treat land in any way we wish; simply get the plough that will best bring up the subsoil. Now there are two ways of doing this—two general ways, and both are good; both have been tried by us. You may bring up part of your under-soil and use it for years, mixing it with the top of your other soil, or you may bring it up all at one time, burying the other beneath it. The latter is the best way where you have time and can afford it, for you have a raw fallow here, and it requires time to reduce it to a proper growing soil. The first year—generally speaking, of course—there will be little more realized than to pay expenses, and this, on the whole, is a favourable look; we are inclined to think the majority of cases would not pay expenses, we know in our testing, this has been so. The first two years there was little to pay—grain scarcely anything, grass a failure. What has been proved is, that the thorough working of the soil, beginning in the fall by throwing it to the frost and the snows, and re-ploughing, ploughing often, and cultivating in the summer—this gives a chance for the elements to act constantly, and do a good work. They of course prepare the mineral and what vegetable matter there is for plant food. They disintegrate and reduce the harsh soil to the proper consistence and making it mellow—the first time in its existence, and mellower and better (mechanically) than the soil that has been turned beneath it, which has been hurt by its bad treatment, and is glad to lie still and rest.

One season's treatment of this under-soil will give you a fine sight; you have a cushioned field yielding softly, deeply to the pressure of the foot; you have, most likely, a new colour—darker or lighter, or variegated; you have few or no weeds; you find the rains

o affect your land but little; and if the drought is ever so great, you will be surprised at the moist condition your land is in, the old land below helping in this respect, and it does to a great extent, the upper soil acting as a great mulch to the farm below, which, in compensation, gives back what is wanted when the earth suffers from thirst.

You need not be afraid to do this. But first become satisfied that your under-soil is a good one—that is, one containing the elements of plant food. If there is clay and sand, with some vegetable matter—which is likely, as it drops from above, the lime being sure to do this—there will also be more or less inorganic matter which has found its way down; the clay, especially if more or less firm, will have retained this. These you all get; many of them are fit to be used at once.

There is some land equally good below as above, some better, some much better—we mean, for immediate use. This, of course, wants to be brought up at once. A rich sandy loam is apt to be such a one. You find the soil along our rivers, and in other places. Where there is mostly gravel, or simply clay or hard-pan, and these not mixed, it is best to leave them where they are, as you would the rock that underlies some soil. You can tell—you may have experimented, most if not all farmers have—whether your soil below will admit of being brought up. If not tested, it may be easily done; but test fairly, expose to the frost, the sun, the rains, and to the harrow and cultivator, after the plough has brought it up. Quite likely you have a farm below your present one that is a good one—one that can be made much better than the one you now work; and there will be a new soil, new in colour and in quality to a greater or less extent. You may, in such case, be enabled to raise grain from a field that would not grow a particular grain before—wheat, for instance, or corn, possibly barley; grass and clover are pretty sure to do better, and to yield, with proper top-culture, crops of a permanent character, for *you have now really two farms to do the work of one.* If the grasses (some of them) do not reach down to the old soil, the clover certainly will, and so will the wheat and the corn, and the fruit trees and berry bushes; there are few things that will not do it, so that the old farm is still in service.

But we have prepared this new land. There is sand and clay, and it will be seen some vegetable matter, decayed roots of some stubborn stumps that yielded slowly, and other novelties, to interest. Here is a body of soil some 6 or 8 inches deep, well prepared, overlying another of the same depth. We have much mineral and some vegetable matter. The elements having acted upon these thoroughly for a year, there has been considerable disintegration and chemical action. This land, which you dread after all to trust, is doubtless the very thing for wheat; wheat loves a mineral soil, where the inorganic elements are plenty and the vegetable old, well prepared. There is little doubt that you will get a crop of wheat that will pay, and a crop of clover to follow after that will more than pay. This becomes certain if you use manure as a top-dressing. You need but a footing of the clover, and it will help itself; the manure will do this, and it does not need much, only spread evenly and finely, as all manure should be applied. But this soil will generally bear manure, and be benefited by it—more benefited than other soil that has had frequent doses which have acted upon it. This being new, the full force will be felt, chemically and mechanically. It would help at once, after ploughing in the fall, or applied in the spring, better in the fall.

Late fall or winter ploughing is the thing to start this with, and it will be ready for you to work during the summer, beginning after spring's work. In the fall you may be safe with wheat if you use manure, and possibly without it; we have known cases where the latter acted successfully, outdoing the crops that were raised before. Judgment is required in the matter. But if the land is not ploughed in the fall—if only in the spring, and not summer fallowed, worked, thrown to the light and heat, a crop in the fall is very risky; there needs another ploughing and another season, and then the prospect is not flattering.

FOOD FOR STOCK.

By Mr CHARLES PINNIGER.*

THE natural consequence of such a very long term of drought as we last year experienced, has been to absorb all the farmer's profits and a very great deal of his cares too. One friend informs me he is nine tons of cheese short of his usual make, which, reckoned at £70 per ton, amounts to £630. The pastures in these and adjacent valleys, usually so rich and fertile, were suddenly brought to a standstill; and vegetation, at the time when the hope of the husbandman is on the alert for the return of summer, was at once cut short by cold, cutting easterly winds, with a total suspension of any rainfall of importance for many months together, with the certain result of the loss of our hay crop, as well as the equally calamitous prospect of starvation of our herds and our flocks. I have myself five stackyards, where I usually put a hay rick, but which now have none at all in, and another one or two would be nearly the same but for a little left of the previous year's growth.

HOW BEST TO ECONOMIZE SHORT SUPPLIES.

Our hopes, then, of getting through this severe winter, without a very heavy outlay of money, or ruin of our cattle, are faint indeed, and may well induce a meeting such as this to consider what under the circumstances is to be done, or, as our text says, "How best to economize and make the most of what we have." There is one consolation under it. It is generally, I believe, admitted our crop of straw is nearly, if not quite, an average one. More particularly is this the case of wheat-straw, the quality of which is first-rate; so much so we scarcely ever knew it so good, and here in a great measure must be our dependence for the saving of the lives of thousands of our cattle, and sheep too. Well, then, how best to consume so as to make the best of this very valuable material, is the question each one appears to be asking the other, and on which each one is desirous of being better informed. That there is a mode of rendering straw really nutritious, there is but little doubt; at all events, we can so supplement it with other matter that it can be made an exceedingly valuable adjunct to our usual resources. Indeed, I must say I have positive proof of it daily before my eyes. Some gentlemen informed me that the farmers in the neighbouring county, diluted or moistened their wheat-straw cut into chaff for the cattle with cider, having had a very bountiful crop this season. Another informs me that in another county farmers cut up their wheat and other straw, and mix it with a quantity of salt, and lay it up in store for winter, when it comes out a really fattening substance. This may, to a certain extent, be a palatable, but, I imagine, not very nutritious food. Another gentleman informs me he cuts his straw into chaff three-quarters of an inch in length, and sweetens it with treacle and water at the rate of 1 lb. of the former to each animal per day, and this with satisfactory results. I am very fearful in instances like this; the palate of the animal is better pleased than the system is fed, and the belly of the animal is made to grow big while the back grows very thin. Another gentleman assures me that his cattle do exceedingly well on cut straw and 4 lb. of palm-nut meal each per day, at £8 per ton, spread over the chaff, the straw cut the same lengths as in former cases. Now this must be a very cheap mode, and will well compare with any one I have met. I am not quite sure if he informed me whether his cattle were in-calf cows or barren stock. Now if this mode of 4 lb. of nut-meal will effect all this, which permit me to say, I very much doubt, it must be economical, because 4 lb. of this preparation at £8 per ton will cost only 4d. per day, or

* Paper read before the Swindon Chamber of Agriculture.

2s. 3d. per week, in addition to 2 cwt. straw at 3s., which makes it up to 5s. 3d. per head per week. Supposing that ten will eat 24 bushels of chaff, or 1 cwt. of cut with a very little hay each, in on to 4 lb. of cake, this gentleman get his cattle kept on palm-nut meal it straw at the price of 5s. 3d. each per which would be very cheap.

STRAW, HAY, AND CAKES.

v, if instead of 2 cwt. of hay I give 1½ f straw at 3s., ½ cwt. of hay at 2s. 3d. ling price £2, 10s.) and a ¼ cwt. of er week, I expend 8s. 4½d. per week. looks a startling sum for seventy or cows—it amounts for eighty cows to er week, or very near it. But we now to matters of fact. My friend, whom I ll A-1, informs me he has put off all his cows in his arable farm at straw at 1 of roots and 2 lb. of cake per day, his costs him, to receive anything for aw, 6s. 6d. per head. Then he informs keeps his forty-five grazier cows at on cut straw and hay, half of each, ned with porridge made of 1 bushel of l to 60 gallons of water, with the addi- 100 lb. of pea and barley, mixed and d over the mass sufficient for two days, ie rate a trifle more than of 6 lb. of meal y to each cow. Now this, without hay aw, costs 2s. 3d. per week, or the cost of 4s. 6d. spending price, and same of straw 6d., comes to just 8s. 3d. each cow. , he says, are just his youngest cows, e older ones it would be scarcely 1. One thing, he considers 2 lb. of er day would be equal in nutriment gruel, &c., at a little more cost and t deal less trouble, or very nearly 9s. ad each. I find our cows in the Lon- airy kept well on hay, grains, roots, ake, cost 12s. each per week. My d, though I may say I can scarcely define one, has been to cut my straw very little hay by steam power into moistened with a little treacle, and indiscriminately to all the stock. ushels of barley were boiled and thrown in with each day's mass for a time, but which we have now discontinued for other matters to make it up. In fact, I have, as I said, no definite scheme. I endeavour to watch my cattle, and by so changing and moving them about where necessary, I endeavour to see all going on as well as under the circumstances we can, but we feed all indiscriminately on this chaff; the calving cows, young stock, and yearlings are indulged in extra cake, &c., as a make-up, with a few mangolds, and they appear to do exceedingly well. I do not see how one can classify them to different food, but I give to the classes most needing it an allowance of cake extra when required, the efficiency of which is most manifest in the way the cattle are doing, compared with what they did other years when food was very abundant and no stint of it was given. I have made a few experiments in boiled linseed, treacle, &c., myself, and I am able fully to concur with the views of those of my friends I quoted before. The linseed, I believe, acts as an incentive, sweetened with treacle, to lead the animal to crave for it; though I do not see any beneficial results beyond that it helps (and this I consider a most essential thing) to assist in pushing these husky and clogging matters through the intricacies of the cow's stomach, which, to me, does not appear formed to feed on the dry materials given to other of our domestic animals.

FEEDING EXPERIMENTS.

These and various other experiments have been tried, in all of which I have been anxiously watching for a more marked improvement than I have yet seen, prostrated as they are with this very rigorous season and the effects of the terrible infliction of the foot-and-mouth disease, from which we are barely recovered, and from which I do not expect to be fully rid of for a very long time to come. It is called by some one a terrible scourge, and I fully endorse that opinion. I look upon it as one of the dairyman's greatest drawbacks, yet I do hope, as we are now fully got into the swing of feeding our cattle, they look and do better than at any former time.

For the last few months we seem to fully appreciate the worth of it, and have reconciled our minds to putting our hands into our pockets, to endeavour by so doing to make the most of what we have, and use to the best advantage what we have in the shape of fodder, whether for our sheep or cattle. Other friends of mine with a large stock of mangolds, pulp those and mix with their chaff or cut straw, but we all know this food wants the addition of a few pounds of cake or meal, or some other succulent food a-day, to do the animal justice, especially our cows forward in calf. Many will defend the system of giving wheat straw whole and not cut. With this I cannot possibly agree, when cattle have to get their entire sustenance from it. I am aware occasions may happen when it may be very beneficial, such, for instance, when we have a lot of old grass on the land. A little may then be eaten with it to help to fill up, and may prove of great good to cattle. As a person once said to me, "Straw may do very well if you can give them two meals of hay a-day beside." Of the different qualities of straw I am not prepared to speak very learnedly, though I think that barley or oat straw, of a light crop of say 3 quarters per acre, on stone brash or gravelly soils, is as good, if not better, than any other variety, either of which is no doubt very preferable to wheat straw. I think, however, from my own experience, there is a great deal of nutritive matter in bean or pea straw, or what we call "poults," where the haulm of pea runs up the stalk of bean, which, holding it off the ground, avoids that dirt and filth peas in a wet season are liable to form being so much on the ground.

GOOD OF OCCASIONAL DRY SEASONS.

But all these are good, and much can be and is made of them, but they all require the addition of something of a more nutritious nature, if you intend doing justice to your cattle in the winter, or fitting your dairy cow to again resume her milk-producing process with strengthened vigour. But I am inclined to think we, as a class, are apt to adopt a very parsimonious spirit to get all we can from poor Peggy, and leave her to take care of herself when her work is done, and she can do no more for eight or ten weeks in winter. The money once gone into our pocket is pulled out again with a very ill grace. I speak now for myself, and think it very hard we do not get fruitful seasons and abundant crops, and so avoid these heavy outlays for the sustenance of stock in winter, and why in the ease and jollity of our spirits we cannot every year say to our cattle, sheep, and horses, "Take your fill, eat, drink, and be merry." Yet, on the whole, I am inclined to believe these occasional dry seasons do us a vast deal of good. They tend to make us more careful of what we have, to point out to us the necessity of being more frugal in our management; to check speculation in our farms; and to observe greater economy in our products, not consuming all in an abundant season, but to lay by a store for a less productive one. The worst and most lamentable to me is, it produces in us a sad murmur of discontent and dissatisfaction. All this I know too well myself, and I know, too, it is not our case alone. It is a national calamity. Every man who buys his lb. of butter and has to pay 4d. extra for it, has cause to lament it; or every man who has to pay 1½d. or 2d. extra for his piece of cheese, his beef, mutton, or bacon, may well see in it cause for discontent. Thanks, however, to our cousins in Ohio, Wisconsin, Illinois, and other States of the great Union across the water, who have sent us a good supply of cheese this season, they have much kept down the price of that article, or it would have been much worse.

ADVICE TO YOUNG FEEDERS.

One more word I wish to have with my young friends. It is this: Do not think too much of, or put too much dependence in your stock of wheat straw. You have a few good-sized ricks in your stack-yard, and you fancy them almost inexhaustible. You have a great abundance there now, but nothing is more fleeting or deceptive. Why, one stack of hay of 30 tons will yield more fodder than the straw of 40 acres of wheat, and if you are very short of hay I would advise you to pur-

a little to cut up with your straw, and pend a little on linseed, palm nut meal, , or pea meal, so as to make the most of you will find your wheat straw gone be- ou are aware, and then be obliged to go man of hay to buy, who will not forget arge you for it when he sees you are d to come to him. It is a long tiresome to wait with such scant provisions, and forget the old adage, "May come early, ly come late, will be sure to make the old quake." We remember the tale of the old Irish farmer, in a time of great distress hay and straw all gone, and nothing left for his poor old cow—who was lamenting it very sadly to his wife, when Biddy said, "Och, John, don't ye fret, John; shure I have some left for ye yet," and going into the sleeping apartment she flung out the children's chaff bed, saying, "Shure, there is a store for ye yet, John; take that." Such extremities we hope not to see any of us driven to, though I am greatly mistaken if it will not be all got very close together before the usual season for grass comes round again, and when the cuckoo's cheery notes will usher in the spring, and, it is to be hoped, the commencement of returning plenty.

WINTER FOOD FOR FARM STOCK.

is a well-known fact that this year there has been a great scarcity of hay, the being shorter perhaps than that of 1864, ason in many respects similar to that has just passed. Cereal crops, although ng pretty fairly on the threshing floor, ely give an average amount of fodder; he root crop, although in some localities ie north giving good returns, is untedly very short on the whole. Such the case, it is necessary that farmers d find out the best and at the same time nost economical method of employing cial feeding stuffs—stuffs that will pro- a profitable return for the outlay.

interesting paper on Supplementary ls was recently read by Mr W. Hawkins, e the Dorchester Farmers' Club. Much been said and written lately upon the ct of horse-chesnuts and acorns as a able substitute for natural food; but are many districts where the chesnut he oak are extremely scarce, and there- Mr Hawkins dismisses both foods with re allusion. Other commodities have mooted as supplying a cheap and shing substitute, such as chopped up wheaten straw and mustard, also chopped s; but it would be a difficult matter to testify either to their economy, or to their usefulness as fattening stuffs. Straw, Mr Hawkins is of opinion, which is this year sweet and good, and quite as nutritious in its natural state as inferior hay when cut into chaff, must necessarily supply the bulk of the food, whilst cake, corn, and some other of the numerous feeding stuffs must supply the quality. "We can now," says Mr Hawkins, "obtain 480 lb. of maize for 32s.—this food has become a very fashionable one, but whether deservedly so or not, I leave for some one to say who has used it—400 lb. of barley for 29s.; 304 lb. of oats for 23s.; 504 lb. of peas for 38s.; 520 lb. of beans for 46s.; and linseed can be bought at 9s. per bushel of 60 lb. Best linseed cake is worth £12, 10s. per ton; best cotton cake is worth £7, 10s. per ton; best rape cake is worth £8 per ton. So that we find maize, barley, oats, and cotton cake about the same money value per lb.—about ¾d."

A very good substitute for hay is composed of straw chopped into chaff, and mixed with linseed, cotton-cake, maize, peas, beans, or any other stimulant of this kind. This, it has been proved, will be better for sheep and cattle than the best hay, and it will be found quite as cheap. A mixture of hay and straw cut

into chaff, bruised linseed soaked in water, making a thin gruel, which is poured over the chaff; meal, barley, and maize, dusted over this preparation, and allowed slightly to heat, has been found to be very beneficial for stock. Sheep, calves, colts, dairy-cows, heifers, and fattening bullocks, devour this preparation greedily, and animals can digest and assimilate such food to the system, better than uncut hay, roots, &c. Wheat mixed with chaff has also been found a valuable substitute for natural food, and at present rates, it is not costly. Dairy-cows thrive in a well-sheltered yard with plenty of straw, and a daily allowance of 6 lb. a-day of cotton-cake, or 4 lb. of linseed-cake.

Condimental foods are much used amongst farmers and stock-breeders, to give a relish to the ordinary food, and some of the preparations sold by dealers are found to be very good for nourishing winter beasts, while others are found to be deficient in nutriment. Mr Hawkins gives the following preparation, as a valuable one, and from its ingredients we can believe it to be so :—

st.	lb.		£	s.	d.
18	0	Maize	0	18	0
18	0	Oats	1	1	0
18	0	Lentils	0	18	0
18	0	Beans	1	4	0
18	0	Linseed	2	0	0
8	0	Mustard hulls	0	6	10
5	0	Best salt	0	1	3
2	0	Fenygreek powder	1	1	0
1	0	Powdered gentian	0	17	6
1	0	Sulphur	0	3	9
0	7	Canaryseed	0	7	0
0	7	Saltpetre	0	4	0
0	9	Powdered aniseed	0	7	0
108	9	at 1s. 8½d. per stone	£9	9	4

As the spring gives indications of being a severe one, all information tending to economize food, and at the same time keep stock in a thriving condition, is valuable. In this belief, we have given an outline of Mr Hawkins' paper.

THE BREEDING AND MANAGEMENT OF SHEEP.

By Mr Stratton.

I PROPOSE, began Mr Stratton, to speak only of ordinary sheep-farming, if I may so use the word—I mean sheep farming for the ordinary market, or £ *s. d.* point of view. I know nothing about the fancy side of the question, trimming for exhibition, or any of that kind of thing. I have no particular predilection for the animals—I either like them or detest them as they are profitable or unprofitable. And here is a point which I think we too often omit to consider. A man has his usual stock; he keeps them on in the usual way; he changes them from one kind of keep to the other, as the course of the season comes round; he has his usual lot of tegs or what not to sell at the usual time; they go, and he has so much money more or less than the year before, as the case may be. Does he consider, and can he tell us, when or what keep they have been paying best, and where they have paid least, or even lost money? Now, I think, we should be richer men, or rather, I would say, less poor, for I am speaking to farmers, if we more frequently asked ourselves the question, Is our stock paying? And after calculating the costs and seeing where it pays, and where it loses, endeavour in future to cleave to the one and despise the other. Now, of all the different branches of farming, I think the management of sheep is the most difficult to understand. Somebody once said of war, it is a series of blunders, and the one that makes fewest gets the best of it; so, I think, it may well be said of farming,

* Paper read before the Breconshire Chamber of Agriculture.

ılly of sheep farming. We hear every the question, always the first question her farmer asks, What luck with the or with the lambs? Depend upon it, swer to that question is a pretty good tion of the management of the flock; ough I must admit that the best of gers do sometimes meet with bad luck, ; called, I do believe that bad manage- is generally the parent of bad luck, and *rsa*. At all events, I know that when self have had very bad luck, I could ntly remember a bit of bad general- a month or two before. In sheep- ıg, I do believe that to make it profit- ou must manage very well indeed, and badly done are a most unprofitable

So I think you could not have chosen ject more worthy of our consideration discussion, and I think we shall find, calculating all costs, that there are unprofitable sheep kept in this king- than is generally imagined. I have clever farmers say that sheep are a sary evil, that they pay nothing in them- , but are only necessary for corn-grow- With this I, for one, cannot agree. I e that sheep, managed as they ought to ıould not be kept in excessive numbers, erfere with corn-growing, which I have ntly seen done. Have you not often roots kept about too late in the spring, to ruin a barley crop? And, remember, es the profit of a good many sheep to up the difference between the value of res of bad barley and an equal quantity od. I now propose to say a few words ail about the management of a breeding with my humble notions as to its proper gement.

OUR BREEDING FLOCK.

course the first question to be decided mmencing sheep-farming is the sort of you intend to keep, and this is a ques- dependent upon such a variety of cir- tances that it would be preposterous to an opinion; but, as a rule, I think, to with, it is wise to do as your neigh- do, only improve upon them (I mean the sheep of course) as much as possible; it would be perfect madness to put heavy sheep on your mountains, though, possibly, they might with advantage be made heavier than they now are; but mountain farming is one thing which I cannot understand. I cannot understand what pay there can be to a Welsh wether, for instance, from one year old till six, when, I believe, he is generally worth from 25s. to 30s., the wool at 10d. or 1s. per lb. about makes up for losses; so it appears to me that he pays, with *luck* mind you, about 1s. a-year for four or five years. This cannot be making money very rapidly. I verily believe your mountain farmers, for no doubt you are all sportsmen, keep these sheep to afford a good chase for your dogs; and here let me say that I believe the mischief caused by dogging is incalculable—it is the curse of Welsh sheep farming. No sheep can thrive if they are to be run to a stand-still constantly. But let us return to our breeding flock; and here let me say that it should be a point of very deep consideration whether, according to the peculiarities of this or that form, a breeding flock is the right thing to keep, or whether a dry flock would not be more profitable. Of course, in this matter everything depends upon circumstances, but I think one rule may be laid down in reference to this matter—viz., do not keep a regular breeding flock unless you have sufficient rough keep, either mountain run, or other inferior keep, to maintain your ewes from weaning time till near tupping time, for if they are kept on costly food, the expenses of summering will very considerably diminish the profits. My own plan is to buy in full-mouthed ewes, generally in August, keep them always pretty well, sell as many fat lambs as I can, and graze out the ewes during the autumn. My reasons for buying in a fresh lot every year are, in the first place, that I have no sheep walk where I can keep my ewes inexpensively; secondly, I like old ewes. They breed a larger number of lambs, and that better than young ewes. Now, having weaned the lambs, I think we all know that it is quite unnecessary to fatten our breeding ewes. It does them good to

work for their living, only mind they do not get too poor, and that they are well supplied with water during the hot weather. It is not until within a month of tupping that one need be at all anxious about the ewes. I think it is then of great importance to keep them well. They should be decidedly on the mend when the ram is turned out, for we all know how our breed of lambs varies as the ewes are doing well, or are poor and doing ill. Now comes a very interesting period, when the health of our subject should be carefully watched, for a little neglect will spoil the whole thing. Once let your ewes get below the mark, do what you will, you can't get them up again. You will have puny, starved lambs, the ewe can't keep more than one, and often not that. You will have a short breed of lambs, and lose a number of ewes. In short, you will have *very bad luck*. Let us just try to calculate the difference between a flock done well and a similar lot done badly. Let there be two hundred Down ewes. They shall be run in two lots of one hundred each. And here I will describe my notions of how a flock of ewes should be kept. They shall cost 35s. a-head, and be purchased in August. They both shall run stubbles, and be kept in a similar way, only that one lot shall have a tie of rape or mustard for a month previous to a *certain* time, so that one lot shall be in a good state, and the other a little below *par* at that particular time; then they run the seeds and pastures, or clean up behind the lambs; they are still upon much the same keep, but one lot is frequently changed from field to field, the other kept a bit too long in one place. The shepherd has the lambs to attend to in the morning, and keeps our devoted ewes too long in a bare fold, where they had finished up the bits left by the lambs at six o'clock on the previous evening. They continue to run the pastures, when November comes with its usual rains; the one lot is immediately removed to the drier grounds, where a bite has been kept in anticipation of this period; the other lot remains a few days, perhaps weeks, too long on wet comfortless ground, the bit of grass there is dirty and loathsome from the constant wanderings of the dissatisfied ewes. December comes, but without frost; the good manager still keeps his flock on the dry ground, but either hauled them a few turnips, or makes them walk to the field and fetch them themselves; the bad manager begins to think his ewes look very rough, is frightened, takes them away from the grass, and plunges them into a piece of turnips, gives them as many turnips as they can gorge, and hay, which they don't care about, having plenty of turnips, keeps them between the hurdles often in mud up to their bellies. This goes on till January comes with its frosts, when our friend finds his roots decreasing apace, and the hay ricks diminished visibly; gets frightened again, curtails the turnips, and cuts straw with hay into chaff; the consequence is that the ewes are always looking for the turnips, rush at them when the time comes, take in a considerable amount of wind, and consequently feel uncomfortable. Then may be expected a pretty good crop of dead lambs. So the game goes on till lambing time, when our friend finds himself in a very unsatisfactory state as regards his one hundred Down ewes; in all probability he has lost four or five. He has few twins, and even the singles have not sufficient milk. He finds when weaning and shearing time comes, that he has lost ten ewes, and has only eighty lambs, and those are a bad lot.

RESULTS OF GOOD MANAGEMENT.

Now, what does our good manager do? We left him in December with his stock in a very healthy state. In January, or as soon as they require it, he gives a little cake, and perhaps a bit of chaff, or a picking of nice oat, barley, bean, or pea-straw, and so they are continued to be kept until lambing time, always in comfort, always in health. Observe, I have not mentioned hay as part of their diet. I very seldom use hay myself for sheep, and I am quite satisfied that it is quite unnecessary; and at anything like average market price, it is one of the dearest articles you can consume, and not to be compared to cake or corn as an economical feeding-stuff. I have known a flock of ewes eat more hay in

son than they themselves were worth. hat be right? And what is the reason? some absurd restriction about selling hay, bly. Fancy being compelled to consume orth £7 per ton, when you can use cake ich more economically, and will any one at cake feeding is not better for the Moreover, I object to giving ewes cessive quantity of roots before lambing. eve a large amount of ill-luck is to be nted for in this way. Now, the owner e flock I am now describing will find lf, in all probability, at weaning time, bout 98 ewes and 130 lambs. The ewes eep the lambs well and give them a good which is everything with a lamb. Once young lamb "dry" in its skin, as we call it nean pinched, and with its back up—you may move him if you can; he is in-for life. The parallel which I have been ing in a very rough way, I believe to be means an unusual one in real life, and ve you to draw your own inference of difference between profit and loss in two cases. Why, one lot would be almost double as much as the other, et probably have cost no more to keep. vonder that some men like sheep while s hate them, that some are "lucky," s unlucky. I believe the great principle eep-farming is to *keep them moving!* I increasing in weight. I am not re-nending "dogging," mind. If a sheep sustains a check, it takes probably a h to start him again, and all the food he during that period is simply wasted. does Mr M'Combie say of cattle? "If want them to pay, they should never their calf-flesh, depend upon it." It is lly true of sheep, they should never lose lamb-flesh. I expect we are all pretty agreed that in sheep business nothing better than selling fat lambs, and no t, as a rule, it is quite true; but if it possible to keep them on for another onths, always doing as well as when their dams, and with good keeping, it is possible, I believe, the latter part of lives would be as profitable as their ning. Take, for instance, the prize lots of lambs at Winchester fair, in October last. The 300 made over £3 a-head, and you may reckon up the cost of keeping them as you like; you can come to only one conclusion—viz., that they paid right well. Now, you may depend upon it, they were kept "doing" the whole time. I will here say that the dams of the first-prize lot have tasted no hay for two or three years.

THE PRINCIPAL FOOD OF SHEEP.

The principal food of the lambs was vetches, sainfoin, and cabbage. I will not pursue the daily life of a lamb from its birth to its death, for that would be asking too much endurance from you. I will simply say that I believe it is very essential to give young lambs a succession of *fresh* keep if hurdling be the system adopted; let them at least have one fresh piece every day; and if the system of grazing the whole field be adopted, on no account let the keep get too big before stocking, and when stocked don't keep them there too long, remembering that for every day they remain there after your keep is stale, they will take two days of good keep to make up what they have lost. Rely upon it, for sheep to do well upon seeds or grass, they should be pastured in moderate numbers with other stock, and frequently shifted from one field to another, always having the opportunity of obtaining good water. There's an old saying, "If you want more milk, sell a cow." The same may be applied to sheep, "Do not over-stock." A few sheep well done will pay a lot more than a large number done badly. Over-stock with sheep, and you spoil your sheep and spoil your land. Here let me say that I think, wherever possible, there's nothing like keeping sheep between hurdles. They are not only spared a lot of injurious exercise—I speak of grazing sheep—but you get the full benefit of the manure, which when sheep are allowed to run over the field, is, to a great extent, wasted under hedges and trees, or where it is not required. I am of opinion that it is unwise, as a rule, to kept young sheep on pasture too late in the autumn; or rather, I should say, get them

on to roots as soon as you can. I believe 1 ton of swedes in October will produce as much mutton as 2 tons after Christmas. unless very carefully secured, and even then they are not nearly so good, or, at all events, they do not make mutton so fast; but that, perhaps, may be on account of the difference in the state of the land and the atmosphere; but whatever the cause the result is the same. I like to get on to swedes or mangolds by the 1st October. My own plan is to give them as many roots as they will eat. I speak of fatting sheep with about 1 lb. of cake or corn per day. No hay. I find the sheep, as a rule, do very well and pay me a fair price for my roots. I find 1 lb. of cake per day and 20 lb. of roots to be about the average quantity a fair-sized "teg" will consume, and reckoning in this way, I have been always able to calculate the time my roots would last me, and this is sometimes useful to know. There is a prevailing notion that mangolds are unfit to feed with sheep on the land in autumn. This is, I venture to say, a great mistake. I would quite as soon have mangolds as swedes in October, November, or December; and as they are a much more certain crop, I shall go in for a very large proportion of mangolds. I have fattened a lot of sheep on mangolds this last autumn, and never had sheep do better. In conclusion, let me say that to be successful in the breeding and management of sheep—I mean successful in a pecuniary way, like all other branches of business—it must be thoroughly understood and well carried out. We must think over our blunders and profit by them, and not go and commit the same blunders again. We must look our mistakes fairly in the face, and not slur over them, and call it all ill luck. I am here reminded of two very big blunders of my own only last year. I know it is generally thought that any fool can be a farmer—and so he can in name; but I am sure you will agree with me that any fool can't make money at farming. I believe a prevailing error among farmers is a fear of expense. We too often spoil the ship for the sake of a halfpenny worth of tar. The most profitable lot of sheep I ever remember were kept the most expensively: after paying for their corn, they paid 30s. a-ton for their roots.

HOW TO PRESERVE MEAT.

AT a meeting of the Society of Arts, Mr Richard Jones read a paper upon Meat Preservation. After enumerating the various processes by which meat was preserved by the salting process, the drying or dessicating process, the chemical process, the tinned cook meat process, he described, as we have the speech reported in the *Journal of the Society of Arts*, a process of his own, for which he claimed the following special advantages.

I will proceed to lay before you the particulars of a system upon which I have been engaged for the last few years, which, having now been taken up by some manufacturers, may be said to be fairly launched before the public. Before going into these details, I wish to say one word relative to a process, recently attempted, of cooking meat by the chloride of calcium process, and preserving it by chemical agency. It is simply a modified form of the applications previously described, and partakes of their drawbacks. The advantages which I claim for meat preserved by my system are—

1. That it is not over-cooked, and loses none of its nutritive qualities.

2. That when turned out of tins it is not to be distinguished from that cooked in the ordinary mode by the kitchen fire or in the oven, is pleasing to the eye, and cannot offend the most delicate palate.

iat the system is exceedingly simple, irely free from any foreign agents.
iat it is in accordance with scientific lge, and founded on well-known natu- s; and can only fail through the or incapacity of the operator.
iat it is equally applicable to all of food products of every country, uite unaffected by climate.
ng stated these advantages, I must our to make you acquainted, in detail, : means adopted in preserving by my

The tins are filled with the raw . and placed in a bath, either of boil- r or of chloride of calcium, as may be

Before being immersed in the hey are attached by means of a tube l to the cover, and joined to a tap iicating with a vacuum chamber. In experiments I used a Torrecellian

I, however, find that Messrs of Aberdeen, who have adopted my or greater convenience, prefer creat- r vacuum by means of steam, con- the same by jets of cold water. On being attached, as described, to the that, with their contents, they are iediate communication with the :, all the air being drawn into it, e then immersed in the liquid, at . Fahr. The operation then going on perature, which is gradually raised to e as nearly as possible the cooking dinary kitchen oven. The tins form n, the liquid is the heating medium itead of the fire, and in consequence acuum applied, the steam and mois- ends into the chamber, where it is ed. The vacuum is used to remove sture, and any germs and decompos- s which might be prejudicial to pre- n; but it must be used after the first r very sparingly, otherwise too much y be abstracted, or the food may be id would, consequently, burn in the The time necessary to cook and pre- duck in this manner is about two It will be seen that nothing escapes : tin, save the air and water.
) the appearance of the food when turned out, I can only refer you to the specimens on the table, some of which I think you would be at loss to distinguish from food prepared in the usual manner.

My third claim does not require any further proof than the short description of the operation which I have given; and I regret it has not been in my power to shew its actual working, when I doubt not that its simplicity would be admitted, as it has already been by those who have inspected it.

The system is in accordance with scientific knowledge, and founded on well-known natural laws. I have already explained one of the theories of the cause of putrefaction—viz., the living microscopic germ theory, and should that be correct, it will be easily seen that two hours in a temperature of 230 deg., advanced to 270 deg., is sufficient to destroy any germs which may be assumed to exist. Should it be asserted that oxygen is the sole cause of putrefaction, it will be equally apparent that all the air in the food is removed before and during the process of cooking, when the vacuum chamber is in direct communication with the tins. With regard to what I may term the negative theory, advanced by Dr Charlton Bastian, of spontaneous generation, all I can say is, that tins of meat preserved on this principle have been round the globe without any one becoming decomposed, and of many sent out to Australia (all of which were good) one obtained the highest prize medal at the Sydney Exhibition, New South Wales. In alluding to the water process, by which Dr Charlton Bastian denies the possibility of meats being preserved, I have not seen it noticed by any one in this controversy, although a fact worthy of consideration, that enormous quantities of bottled tart fruits (unripe) are preserved by simply placing the corked bottles in a bath of water raised to a temperature of 180 deg., for three hours.

It will be perceived that the great objection to preserving meat in hot weather, and which, even by the chloride of calcium process, is impracticable in some parts of Australia for about one-fourth of the year, is entirely obviated by this system, as air,

with its microscopic germs, is withdrawn into the vacuum before preserving begins, and the operation may be repeated several times before cooking is far advanced, without any detrimental results. In order to explain what may appear to be a most unnecessary length of time in cooking by the ordinary water of chloride of calcium process, it is undoubtedly true that it takes over seven hours before the centre of the meat in a 6-lb. tin of beef is raised to a temperature of 210 deg., and by the chloride of calcium process, at a temperature of 240 deg., it only takes four and a-half hours before arriving at a similar result.

The time required for effectual preservation by the system I advocate, can be regulated at the will of the operator, for, by withdrawing the moisture, he is enabled effectually to roast the meat at any temperature, even up to 300 deg.

A special characteristic, although I do not claim it as an entire novelty, of my system is, that meat can be as easily preserved with bones as without, and, as far as appearances go in articles of diet, it will be admitted that this is an important point. The expense of preserving is rather lessened than increased in consequence of the shorter period taken in effecting the object. The only additional expense is the soldering the small tube on to the tins.

HINDRANCES TO THE DEVELOPMENT OF AGRICULTURE.

By J. H. Piper.*

WHEN discussing the tenure of land, one is irresistibly led to reflect upon the associations surrounding it. There is, however, one aspect of the question which materially affects modern agriculture, or rather the conditions under which modern agriculture is carried out. While there has been a marked change in the relations of every other kind of property, and a spirit of pure commercial enterprise has permeated many of our institutions, the holding of land is associated with many relics of the past, which rather clash with modern ideas and customs. When the old feudal system was in force, retainers held their land upon the condition of doing suit and service to their lords, and there was an implied understanding that retainers, serfs, and all connected with the soil, had the means of existence in some form or other. Later years saw the feudal system gradually disappear, and give place to a mode in which a rent was payable, accompanied, however, by many of the feudal restrictions, in spirit if not in form. By-and-by came a noticeable change—as far as the owners of the soil were concerned. Improvements in locomotion enabled rich men to travel, and thus new tastes and desires were incited. The aristocracy were enabled to visit foreign lands, and when not abroad the attractions of London life or society at Bath and other places had great charms for them. Thus they lived comparatively little upon their estates. The untitled landowners also migrated, the old manor houses being in many cases deserted for residences in more congenial places, where the pleasures of society and the benefits of learning for families were to be procured. The state of agriculture at this time was far from satisfactory. Innocent of any stimulant beyond what was gained by the application of such manure as was obtained from stock fed only upon the produce of ill-cultivated soil, the land was not likely to yield large returns, hence a system of restricted cropping became a necessity, and the only protection of the landlord against an exhaustion of the soil, which in those days meant very often its utter unfitness for agricultural purposes in the future.

IMPROVED RELATIONS BETWEEN LANDLORD AND TENANT.

But while the conditions of agriculture have been entirely changed, fallow-land having become a term of the past, and the producing powers of the soil measured only by the frequency and character of the applications of fer-

* Paper read before the Swindon Chamber of Agriculture.

, the tenure of the soil—the terms upon the tenant holds it—have, comparatively ng, remained unaltered, the changes in irection being scarcely distinguishable. are still restrictions as to cropping, though neral use of manures renders such regula- unnecessary. There are still tenants-at- ough the primary condition of successful n farming is the power to hold the land given time, and thus reap a return for l invested. Game is still preserved, with ference that it is not always shot by the rd, to which no one could object, but is et to strangers for a money consideration, ent to the London market, while rabbits— lying with a rapidity which makes many ier sigh when he beholds one of those ani- -are the perquisite of keepers, who main- uch a stock as only farmers living in a country can properly describe. When lering this altered state of things, we also hat rents have largely advanced, it is not lt to see that the farmer has a case which ids a remedy. Upon this subject a great as been said and written, and a variety of suggested, of more or less value. Some s—usually the gentlemen who denounce r magistrates, and ridicule farm wages, in ondon daily papers when other topics are demand the interference of the Legisla- nd talk largely of a Land Bill for England, power to compel landowners to do justice r tenants. This may do very well to amuse s who require occasional doses of abuse of ig institutions, but I venture to say that if ricultural counties were polled to-morrow, would not even be a respectable minority in r of an English Land Bill. The cases of nd and Ireland are totally different. Eng- nant farmers neither desire the lives nor roperty of their landlords; they do not eir rent by discharging blunderbusses at ds, or by beating to death unoffending s, who simply do their duty. On the con- no body of men in England are more to the side of order, justice and the main- ce of the law, than the farmers. By them, llord is treated with respect and considera- nd when the owner of the soil desires a shooting, that farmer considers himself the fortunate who can shew the best head of

What need, then, is there for a Land or England? I am, however, reminded I have just said the farming community nade out a case for redress. That I repeat, is not a case which needs the interference of the law, nor, indeed, of any outside influence. The whole question is one between owner and occupier, and is to be dealt with upon the basis of mutual concession and good feeling. There is no reason why a landlord should not be ready to grant a lease of a farm, as the owner of a house in a town is willing to give a lease to a good tenant. It must, however, be admitted that landowners have many temptations presented to them to act differently, as I shall presently endeavour to shew. As to game, there is no topic under the sun which has been more abused, or which has been the subject of more twaddle and false sentiment. Tenant farmers have not the least objection to game, in the proper sense of that term, and are always glad to find birds strong and plentiful; what, however, they do object to, is the existence of what is termed ground game—hares and rabbits—more especially rabbits, which eat vast quantities of produce, waste still more, and poison and render useless for a time the very soil on which they congregate. This is the chief, if not the only, feature demanding change in what Cockney writers are pleased to term the Game-laws. Make rabbits vermin, giving the tenant power to destroy them, and in less than a year we shall hear no more of the Game-laws. Poaching has no relation to the Game question, for as a rule the poacher is usually the greatest scamp in a village, and when he does not poach he is engaged in pursuits even less harmless.

COMPENSATION FOR UNEXHAUSTED IMPROVEMENTS.

If, then, security of tenure can be given without the interposition of the law, and the game difficulty is merely a matter of an edict as to the destruction of rabbits, it does not seem a difficult thing for owner and tenant to understand each other upon the matter of compensation for unexhausted improvements. It is beyond question, undesirable that a tenant should feel his expending money for the good of a successor—the inevitable consequence being a comparative stinting of substance to the soil, affecting its material value, and in time re-acting upon the tenant himself. It must, however, be admitted that with an uncertain tenure—for year to year is uncertain, even with a good landlord, as death and changes will come—it is not reasonable to expect that farmers will expend capital in the soil which they cannot realize when they leave, and the value of which is indefinite unless there be a system applicable to the matter. Still, this is not so much a landlords' as a tenants' question

—though the owner of the soil may be an indirect gainer. If the incoming tenant has to pay the outgoing occupier for what he has expended, the landlord clearly does not gain by the affair, except that his farm is in better condition, and may eventually let for more money. Even if the landlord should pay the compensation himself, he cannot hope to get a very large interest for his money in the shape of increased rent. The more this question is looked at, the more does it present facilities for being satisfactorily dealt with, provided the subject be approached in a proper spirit. In my native county of Devon, I find great interest is being manifested in the matter, and at several of the ploughing-match dinners this autumn—an institution peculiar to Devonshire—landowners and tenants have debated the matter. With a view of eliciting opinions on so important a matter, an eminent land-agent of that county has put forward a scheme which he thinks likely to meet the case of a yearly tenancy. As our object to-day is to elicit opinion on a topic affecting agriculturists, I have thought it not inappropriate to transfer that scheme to my paper, as follows :—

Yearly Tenancy.—At the end of such, tenant to receive compensation for unexhausted improvements, according to the following rules, that is to say—

RULE I.

Bone manure with turnips, over five years :—

1st year	the tenant to be allowed the whole	20s. in £1.
2d ,,	... ...	10s. do.
3d ,,	... ...	5s. do.
4th ,,	... ...	3s. do.
5th ,,	... ...	2s. do.

RULE II.

Guano over four years :—

1st year	... ...	20s. in the £1.
2d ,,	... ...	8s. ,,
3d ,,	... ...	4s. ,,
4th ,,	... ...	2s. ,,

RULE III.

Superphosphate of lime and other artificial manures used for turnips—the same as rule II.

RULE IV.

Top dressings for white straw crops :—

1st year	... ...	5s. in the £1.

RULE V.

Corn, linseed, or oil-cake, fed in the last year of tenancy, by fattening stock or sheep, to be repaid twenty per cent.

RULE VI.

Purchased yard, pig, or any decomposed manure :—

1st year	... ...	8s. in the £1.
2d ,,	... .	4s. ,,

RULE VII.

Lime.—If used by itself or with common mould, over three or four years, according to soil :—

1st year	... ...	10s. in the £1.
2d ,,	... ...	6s. ,,
3d ,,	... ...	4s. ,,
4th ,,	... ...	2s. ,,

RULE VIII.

Chalk.—If done by consent of landlord, the price and quantity per acre to be first agreed on by landlord and tenant :—

1st and 2d years	... ...	20s. in the £1.
3d ,,	... ...	15s. ,,
4th ,,	... ...	10s. ,,
5th ,,	... ...	5s. ,,
6th ,,	... ...	2s. 6d. ,,

RULE IX.

Draining.—If done with turf or tiles (when the tiles are found by landlord) over six years :—

1st year	... ...	20s. in the £1.
2d ,,	... ...	15s. ,,
3d ,,	... ...	10s. ,,
4th ,,	... ...	6s. ,,
5th ,,	... ...	4s. ,,
6th ,,	... ...	2s. ,,

RULE X.

Pipe or tile-draining by consent of landlord, tenant finding everything, over ten years :—

1st year	... ...	20s. in the £1.
2d ,,	... ...	18s. ,,
3d ,,	... ...	16s. ,,
4th ,,	... ...	14s. ,,
5th ,,	... ...	12s. ,,
6th ,,	... ...	10s. ,,
7th ,,	... ...	8s. ,,
8th ,,	... ...	6s. ,,
9th ,,	... ...	4s. ,,
10th ,,	... ...	2s. ,,

RULE XI.

French grass to be paid for according to value, not exceeding four years.

RULE XII.

Extra buildings required to be subject to an additional rent of 5 per cent. on the outlay.

RULE XIII.

Temporary Buildings.—Any shed put up for sheep, cattle, or manure, done by tenant, to be taken at a valuation, or he is to be allowed to remove it.

RULE XIV.

All consents to be in writing.

RULE XV.

if any dispute arise between landlord and
t respecting any of the before-mentioned
or respecting the fulfilment of any condition
e foregoing agreement, the same to be sub-
o referees, one to be chosen by each party,
ı third to be named before proceeding to
ess, whose decision shall be final.

etails of this plan may be open to objec-
experience, as well as the circumstances
unty, may suggest variations, but the
: which it embodies is worthy of notice,
calculated to place the relations between
and tenant upon a commercial basis,
venture to suggest is the only satisfactory
dealing with the matter. As a rule, the
inciple of paying for value received, and
, is the best and safest mode of conduct-
ness relations. It is found to prevail in
t commercial transactions of the nation;
:s professional men in their business;
mines even questions of public policy.
:ason, then, is there for excluding the
cial principle from so important a feature
stry as agriculture? Restrictions here
re, little services to be performed, petty
lauses, are as irritating as they are un-
e, and mar the growth of that very com-
feeling which it is thought so beneficial
vate. I am aware a great deal is said
:stroying the old relations between land-
l tenant, and putting an end to the claim
ideration which an old tenant is said to

This, however, is mere sentiment, for
enant who has always been strict in his
; obligations to his landlord, is quite as
of esteem as one who has fulfilled obli-
of a different nature. Further, the old
theory often acts unjustly towards the
l, compelling him, by moral influence, to
ın old tenant, whom the landlord, and
dy around, and even the tenant himself,
eak the truth, are quite aware of his un-
for various reasons, to continue a holding
s beyond his capital or capabilities.

AL RELATIONS OF THE TENANT TO THE LANDLORD.

e is also another view of the case—viz.,
a matter affecting the relations of two
of men to each other, blame or merit
possibly be on one side alone. The rela-
nutual, the causes relating to, and the
ırising out of such relation must be mu-
o; the two cannot be separated. Hence,
ıse offering a few remarks upon what I
he tenants' side of this question, pre-
mising that in whatever I may say I desire to avoid being offensive. Let me then say, at the outset, that a lack of moral courage and candour on the part of tenants often leads to misconception. How can a landlord possibly know of the feelings and wishes of his tenants, unless they are presented to him in a temperate, intelligent form; and yet, how rarely do we hear of the rent audit being made the occasion of a respectful, firm and temperate expression of the views of tenants? It is a mistake to suppose that an honest expression of opinion fails to gain at least respect, but then it must be a united expression. For two or three tenants on a large estate to differ from the apparent feeling of all their brethren, is to earn for themselves the character of being dissatisfied, though they are but giving expression to the views held by their reticent neighbours. Who has not heard sentiments expressed in the Corn Exchange, or at the market table, which, properly speaking, should have been made to a landlord or steward? Is that the way to seek a remedy for any grievance? It must not be forgotten that if landlords impose restrictions and exact certain concessions, tenants sometimes ask, and, indeed, expect concessions to them. Thus, in a bad season, a reduction of rent, or an extension of time, is sometimes asked for. There is one other fact which is bound to exercise a prejudicial effect upon the tenure of land, and that is, the keen competition for farms. I observed just now that landowners had great temptations offered to them to avoid leases and adhere to yearly tenancies. This competition for farms is the chief temptation. The owners of the soil are but men, and a landed proprietor with a numerous family and many claims upon him, is placed in a peculiar position when he knows that if he parted with every tenant he could re-let at enhanced rates; or, as is often the case, he continually receives intimations that other persons, sometimes the neighbours of his tenants, will give him a higher rent. This is a very serious aspect of the question, and is likely to become still more so. The fact of being isolated in the country, away from towns or centres of industry, prevents farmers from apprenticing their sons to various trades, and, as a consequence, they learn farming, and in their turn desire to obtain a holding. Nothing can check this unnatural competition but emigration to our colonies, where hundreds of thousands of acres of virgin soil in Canada, Australia, New Zealand, as well as in the United States, are awaiting capital and industry to

extract from them that wealth they are willing to yield. This, however, is a matter to which I only incidentally allude, as it does not affect the question we are discussing.

FUNDAMENTAL PRINCIPLES GOVERNING THE RELATIONS OF LANDLORDS AND TENANTS.

To sum up what I have advanced, and to deduce a conclusion from my arguments, I would venture to say, that all turns upon the nature and condition of the agreements upon which land is held. To my mind, the fundamental principle which should govern the relations of landlord and tenant, is an adherence to the strict rules of business, an observance of purely commercial rules and habits. There should be an abandonment of little exactions—individually trifling, but in the aggregate a burden—on the part of the landlord; on the other hand, the tenant should abandon anything like a departure from the rule of value received. If a farm is let for a term at an agreed rent, and the landlord abandons any other stipulations than those which secure his rent, provide for good cultivation and for a valuation on quitting, he ought not to be expected to remit a portion of rent if the seasons are bad, or contribute to losses of stock. The moment this is done, the tenant is placed under an obligation to his landlord, and cannot well refuse some concession in return. I anticipate being met with the objection that the commercial principle is not always applicable to farming, but as it is applied to every other calling, I should like to hear a practical opinion upon this point from some of my agricultural friends present. What is commercially wrong, is morally wrong, is a severe maxim of political economy, I admit, but experience has shewn it to be none the less efficacious and reliable. I observed, however, at the outset that any change in the tenure of land must be the result of united effort and mutual concession. To the Chamber of Agriculture, therefore, we must, I think, look for a remedy. To the Central Chamber should be delegated the duty of preparing a model farm agreement. A draft submitted to the county Chambers for discussion—landlords and tenants being members of the Chambers, would secure the opinion of those interested. Further, the Central Chamber might issue a paper of questions to landowners, tenant-farmers, land-agents, solicitors, and others, and thus obtain valuable information on which to act. What, however, is needed, is energy and action. If the apathy of the past is to prevail, then no remedy may be expected—nay, none will be deserved. There is a great work for the Chamber of Agriculture to do, and if they succeed, they will have vindicated their right to exist, and have established their power in the country.

HINTS ON FARMING FROM MANY LANDS.

UNDER this heading, we purpose selecting "tit-bits" from contemporaries in every land, in relation to farming, taking care, of course, not to be committed to any of the opinions expressed. All that we wish to do is to furnish our readers with a tolerably good idea of what the general agricultural world is saying about many things:—

KEEP CATTLE IN THE STABLE.

Farmers not unfrequently allow their cattle to remain out of doors when the first cold winter winds come longer than they should. They are not as accustomed to frost as they will be, and thus they are pinched and chilled very much to their injury. They should be kept in the stables on these raw and windy days all the time, with the exception of being turned out for drinking in the morning, at noon, and at night. It will require less food to keep them, besides contributing both to comfort and health. An hour's sunning at noon is also of great value.

ALL THEY WILL EAT.

Persons fattening hogs or beef should crowd both. The best food and the most of it that will not injure the health, should be the motto of every feeder, whether of one animal or a hundred. Hunger always awakens expectancy, which is another word for unrest, and when a lot of hogs or a herd of beef cattle spend half their time looking for the coming of their food, there is little gain from what is given them.

MARKETS AND MIDDLEMEN.

Farmers and produce growers generally are interested in getting the best price for their pro-

interested in getting the best price for their produce, and the more directly they are able to transact their business, the better they will be able to effect this object. Much has been said and written against the employment of middlemen, but as yet without effecting any change in our marketing system. Commissioner Capron is now engaged in collecting information concerning the method of market traffic in vogue in various parts of the country. There is no uniformity of practice or of municipal regulations on this subject, and an important service will be rendered, beyond question, by gathering such information thereon, as will afford an intelligent basis of comparison. This will at least enable the various localities to introduce improvements suggested by such a survey, and to correct existing abuses. A letter on this subject, received from the Commissioner some time since, directs attention especially to the following points:—1. Number of days in the week and hours of the day in which farmers are permitted to sell from their waggons. 2. Amount of space at the market-houses, and on the streets which they are allowed to occupy. 3. Prices obtained by the middlemen or hucksters, compared with the rates allowed them by producers. 4. The bearing of prevalent usages of commission-men upon the interests of producers. 5. Amount of license (if any) required of farmers, and other municipal restrictions or requirements in respect to their sales. Market-gardeners and small-fruit growers should give this matter due attention, as valuable results will doubtless result from this investigation, and we have no doubt any clearly-written, truthful statement concerning the difficulty of obtaining fair dealing at the hands of irresponsible commission - dealers will receive careful attention.

DEPREDATIONS OF DOGS.

The most serious obstacle to sheep husbandry in this country is the abundance and depredations of dogs. Farmers by tens of thousands have sold off, or killed off, their flocks, mainly because they could not otherwise protect themselves against their frequent decimation by prowling curs, which were not worth the powder required to shoot them. It seems to me that a farmer thus despoiled is perfectly justifiable in placing poisoned food where these cut-throats will be apt to find it while making their next raid on his sheep. I should have no scruple in so doing, provided I could guard effectually against the poisoning of any other than the culprits.—*H. Greeley.*

COST OF A BUSHEL OF WHEAT.

HOW many farmers are there who can tell definitely how much it costs them per bushel to raise their wheat, corn, or rye, to fatten their hogs, or get their cattle ready for market? The number is small comparatively, for there are few who have the data on which to base such conclusions. And yet it should be a matter of as much importance to the farmer as to the merchant, to be able to prepare a balance sheet at the close of each year, shewing correctly the condition of his business, and giving him a result on which to make his plans for the future. He should keep an accurate account with each department of the farm; the quantity of hay, corn, oats, and other feed consumed, the expense for labour and for other purposes, and every item of expenditure should be charged; then the income from all sources should be stated also. With such figures a farmer can, at the end of he year, readily determine what he is doing, what it costs to produce his wheat, to fatten cattle, and to conduct the farm generally.

But the excuse for failing to keep such an account is, that "it is too troublesome." Certainly it will require a little time and some attention to keep it correctly—and it will be worthless as a basis for calculation or as a source of information, unless it be accurately kept—but then the direct benefits resulting from such an account, and the satisfaction one feels in knowing just how his business stands, ought to repay one for the care bestowed on it. Many men go on from year to year, without ever having an intelligent idea of what they are doing. They have, it is true, a general knowledge of their business affairs: they can tell how many bushels of wheat they raised, how many horses and mules they own, and if debts press them, and they have not got as much money as they had the

year before, they know generally that things are not going on as satisfactorily as they could wish, but that's about all. They know nothing literally of the details of the relative cost of producing different crops, of feeding hogs, horses, and cattle, and of the per-centage of profit accruing, if any, from different sources, and they have no reliable guide by which to make estimates and determine upon their plan of operations.

But it is not such a task as many suppose to keep such a record as we have spoken of. With a book prepared properly with headings and lines, a few minutes each day, or an hour each week, will suffice for making entries, and after awhile an interest is awakened in the details, and a farmer will derive an unexpected satisfaction is noting down facts and figures, in reviewing the record of past operations and ascertaining what progress is being made. In this connexion, we give an estimate made by a correspondent of one of our exchanges, which will enforce our remarks. It will be seen that his figures led to an unexpected and rather startling result. But there are, doubtless, many persons in this State and elsewhere, who sell their wheat or rye or corn in some seasons, for less than the actual costs of production. When they do not know what it costs to raise it per bushel, they are liable in any year to sell grain for less than it cost to raise it, and so of other products. Here is the calculation :—

I estimated the average crop at 15 bushels per acre : the selling price at 1.00 dollars ; harvest hands at 2.50 dollars ; threshing, board of hands &c., at usual rates, in this section of the country.

The result was an actual loss, all told, of 1.23½ dollars per bushel.

Good wheat has been selling this season for 80 and 90 cents.

As there are many others who have had similar experience with this writer, it is not at all difficult to answer the question "why some farmers are always poor."—*Rural Farmer.*

SUGGESTIONS FOR BREEDERS.

I HAVE a disposition towards taking everything easy ; you have one which causes great excitement on the least provocation. I have animals disposed to lay on flesh and thrive under any favourable circumstances, while your live stock is disposed to ramble, breaking fences, injuring neighbours' crops, and always in such a restless state that the food obtained by this breachy disposition does not increase their value. Therefore, although human dispositions cannot be controlled beyond the salutary influence of good laws, yet animal dispositions can easily be bred and perpetuated by any shrewd, far-seeing man, in a simple common-sense manner, viz. :—by raising from females of quiet, tame temperaments, and males of such a placid temper that they have a natural tendency to fatten, and whose offspring will always turn all they eat into substance of some kind, valuable to the owner, breeder, and producer of it.

Disposition goes much further than this. Look at the human species again, and it will be seen one family are inclined to be tall and lean, or diminutive and lean, while others run very stout, and become monsters of obesity ; but in the whole race of mankind, Providence wisely prevents any perpetuation of unnatural specimens, as it is a fact that in nine cases out of ten a tall man prefers a short woman, and *vice versa*, and so on in opposite directions with respect to other peculiarities ; but as man has a controlling influence over the inferior creation, he has the power to produce pretty nearly what he pleases, if he uses the gifts of thought, &c., allowed him by the Creator. A disposition to fatten—one in females to give great quantities of milk—a disposition to grow wool in sheep—one in any race to arrive at maturity early, or in any other creature to move quickly, can either of them be perpetuated and increased by very plain, common rules, and the wonder is, not that breeders have done so much to improve agricultural and other live stock, but that very much more has not been accomplished.

The great obstacle to individual man's success in producing more improvement has been, and probably will be, the lamentable lack of spirit, the deplorable timidity and absence of true genuine enterprize which attends breeders of all species of animals. Did Fisher Hobbs produce the Black Essex swine by giving them little to eat, although they will fatten and come to maturity quicker than any other breed ? Did Bakewell, while collecting his foundation of the

improved new Leicesters, grudge the best kind of food to each generation, or has anybody ever heard or read of a breeder of hogs, sheep, cows, or horses, who, at any period since the creation of the world, did any good to himself or posterity in improving animals, who was a stingy, mean-spirited man—such an one as would grieve to see his stock eating the best of food—who would feel his own stomach ache to see every other creature's stomach full on his farm? No! no! And any man who has no more heart than to partially starve his stock, seeing them pine away to perfect skeletons, cannot expect to be a prosperous agriculturist.—*E. R.*

THE WARLABY HERD.

THE *Richmond Chronicle* gives the following interesting account of Mr Booth's splendid herd, as seen on a recent visit:—

One of the places which has been made famous to the agricultural community throughout the world, by a rare combination of practical good sense, scientific skill, and thorough knowledge of animal physiology, is Warlaby, which may be called one of the original seats of the renowned shorthorn breed of cattle, and is at this time the residence of a member of the family which has brought this splendid breed to perfection. Warlaby stands about 2 miles from Northallerton, in a rich, undulating, grazing country, without any particular beauty to recommend it, except that kind of landscape sweetness and greenness characteristic of English scenery. The road to it is hardly plain as "road to parish church," but the visitor from Northallerton, which is unmistakeable in a railway sense, can have no difficulty in finding it. It lies in a south-westerly line from the station. If the visitor does not object to a longer and more picturesque country drive, he may pass on, crossing the Wiske, running through a portion of the Warlaby land, till he comes to the prettily situated parish church of Ainderby Steeple, and here, turning to the left through a winding way, for about a mile and a half, he comes to a mansion situated on a sloping hill and half hidden by trees. This is Warlaby Hall, and a time-worn finger-post points to half-a-dozen cottages as "Warlaby." The place is undistinguished enough externally, but it is more famous than the southern prairies, richer in "blood" than all the rolling savannahs and boundless prairie lands of the tropics, and more prolific of splendid cattle than all the "homes" of wild original breeds put together. It is, in short, the chief seat of the "manufacture" — for that is the term to apply to the process—of the shorthorn, the starting point of a breed which may literally be said to be peopling the "outer world," as well as the world of Europe, wherever the British farmer is found. In April, this year, the prize cow Patricia, one of the celebrities of last year's Royal Agricultural Show at Manchester, went, at 1000 guineas, with a beautiful roan heifer, Minaret, 250 guineas, to Messrs Walcot and Campbell, New York. The price of Minaret was 500 guineas, but it was reduced in consequence of the purchasers having a heavy loss by a previous purchase. In July, Lady Grateful, one of Mr Booth's famous cows, was bought by Mr Cochrane, of Canada, for 1500 guineas, and she is now claimed by our colonial brethren, let us hope, to be the mother of future fruitful herds, and will, it is believed, do honour to the original stock. She was accompanied by a beautiful red heifer, Lady Booth, at 500 guineas, and Royal Commander, a magnificent bull calf, whose sire was Commander-in-Chief, was also purchased for 600 guineas by the same gentleman. Let us hope that in Canada he will reproduce the glories of the Warlaby herd. The United States were not successful with their importation, for the splendid cow Patricia, for which 1000 guineas was paid, died on landing at New York. It was one of the accidents of trans-shipment, for she was landed when the weather was hot enough to make the New Yorkers invent another batch of cooling drinks, and unfortunately to prostate scores of them with sunstroke. Field-Marshal Booth, quaintly named after the owner of Warlaby, and a most promising bull calf, was sent to Australia, an enterprising colonist (Mr M'Dougall of Warlaby, Australia) having paid 800 guineas for him, and Major, another of the stock, was sold to the same colony for half that amount. These are the colonial sales for the season, and they sufficiently indicate the value

which is placed on the Booth "blood" in the British colonies and the United States. It may be here mentioned that Commander-in-Chief, for whose use Mr Booth was offered 300 guineas for the season, died on the 29th of August. He was an animal beyond compare, and his death from inflammation was a serious loss, though he has left successors which, it is expected, will rival him in fame and in all the qualities of a successful sire.

But now let us take the road to the Hall through this row of cottages, and past the farmstead, and here we find a group already examining the herd, and expatiating on its beauties. An enthusiastic clergyman, evidently a shorthorn devotee, and a worshipper of the Booth "blood," is pointing out Lady Fragrant to his friends, and probably a better *cicerone* could not be found. "Has she not a sweet head?" he asks, and she certainly is a most splendid animal, as the least professional of amateurs cannot fail to admit. She is graceful, yet enormous in bulk, and she has that modest and plaintive expression which poets have often referred to as indicative of sweetness in a higher class of animal. But we prefer to recite Lady Fragrant's glories in another line. She is the winner of twenty-three cups and prizes, and her owner has refused 2000 guineas for her from the purchaser of Lady Grateful. As a two-year-old heifer she took the first prize at the Royal Agricultural Show at Plymouth, and twice in succession she won the prize at the "Royal" as a cow. At the Yorkshire Beverley Show she carried off two prizes—one as the best cow, and the other as the best female. At Wetherby she carried off the same prize, and in the same order, and at Doncaster she was the best two-year-old, and won the Champion Cup as best shorthorn animal in the show. She was the means by which the owner won the Durham county 100 guineas Challenge Cup, which must be won three years in succession before it is permanently retained. Lady Fragrant carried it off one year as a two-year-old, and again as a cow, whilst Commander-in-Chief took it between the periods of her triumphs. It should be said, however, that there was an interregnum in the contests, owing to the cattle plague, though the result would in all likelihood have been the same, as neither Lady Fragrant nor Commander-in-Chief were ever out of Mr Booth's possession. So much for Lady Fragrant. "She is the finest cow in the world, sir," says the clerical *cicerone*, who, by the way, is never tired of lamenting the demise of Commander-in-Chief, who, in like manner, was the finest bull ever seen.

But now away to the "pastures," where is a herd of cattle quietly browsing, each one almost worth a prince's ransom. They have had "no indulgence" as the civil herdsman, T. White, says. They are just recovering from foot-and-mouth disease, and are therefore not so blooming as usual. They have been out all the winter, a proof of their hardiness, and that prize cattle do not mean effeminate cattle, if we may apply that term. But they are a wonderful lot. There is Lady Mirth, half-sister to Lady Fragrant, and dam of Lady Jane, Field-Marshal Booth, Lord Broughton, Merry Peal (gone to the United States), Lady Joyous, and Merry Monarch. Here is Alfreda, mother of Patricia (which died in New York), Alberta, England's Glory (now at the Royal Farm, Windsor), and Prince Christian (now in Ireland). Here is Melissa, the mother of Minaret (in the United States), Milicent, and Marmion, sold to Lord Bolton. Here also is Lady Beautiful, own sister to Lady Fragrant, but not so grand a creature. She is the dam of a beautiful white bull calf, King James, by Sir James, for which Mr M'Dougall offered 1000 guineas in vain; Mabel, a handsome cow; and Lady Jane, by Lord of the Valley, dam of Lady Booth, sold to Canada, a truly magnificent cow. There are many other animals here with all the grandest characteristic of the shorthorns, but now we must return to the fold yards, where British Crown, a splendid seven-year bull, is brought out for inspection. A most kingly head and neck he possesses, and though he has never won the crown at the "Royal," he took the second prize at the Royal Show at Newcastle as a calf in 1864, the first at the Scarborough Show, and the first also at Howden. He had been in Ireland for three years and a-quarter, where he earned for his owner 650 guineas. The herdsman says, with a sigh, that he is not like Commander-in-Chief, but he is a grand animal nevertheless, "short-legged and dew-lapped," like the Thessalian bulls, whom Shakespeare immortalizes, and of great length. King Richard the Second, ten months old, by Commander-in-Chief, out of Lady Grateful, a rich roan, and very handsome, promises to be a splendid animal. His mother was sold for 1500 guineas. A white calf, calved in March by Lady Fragrant, with Commander-in-Chief for its sire, inherits the splendid "blood" from both sides which our friend admires. It bears a strong resemblance to its dam, and it is hoped will unite the qualities of its

redecessors. Soldier's Daughter, half- Commander-in-Chief, is in the lower s, and, notwithstanding her recent suffer- n foot-and-mouth disease, it is easy to r her grand qualities, and to recognize at e family merits she possesses. A white out of the Soldier's Daugher, by Sir is a very fine animal indeed, with a of a head, and a bulk conjoined with which promises to add further renown Warlaby herd. The white colour so ent in the herd, we are told, comes from llyth, and certainly it has its attractions, the dappled roan of Lady Fragrant our suffrages. A sister of Lady Per- ut of Lady Fragrant, with her mother's as never been shewn, though she will bear arison with the best animals around her. yous, from Lady Mirth, by Commander- f, and full sister to Merry Peal, Field- l Booth, &c., is in the low pastures, as is ilicent, out of Melissa, by Commander- f. The last is two years old, and is a l creature. Blooming Bride, a first-class , is here as well, as is also a white heifer, not yet named, her produce by Commander-in-Chief. She bears a strong resemblance to Bride Elect, whose grand-daughter she is, and is altogether a most promising animal. Christmas Rose, by Lord of the Valley, has borne two calves, though only three-and-a-half years old, and a more promisingly fruitful mother of a good stock could hardly be seen. She has a fine head and bosom, and looks the picture of health and strength. Governor General, two years old, by Commander-in-Chief, also promises to transmit the glories of his sire. He is a very handsome bull, lengthy, and with a good head. Such are the chief attractions at Warlaby, nor would it be easy to find anywhere others of the kind that outweigh them. Here, in this quiet spot, stock is manufactured, for that phrase may aptly be applied, whose renown is as widely known as is the coal of Newcastle, or the cutlery of Sheffield. The produce of the Warlaby Herd will be found in most of the great breeding places throughout Europe, and so well is its value established, that the United States, Canada, Australia, and most of the British Colonies, compete for it.

CARE OF STRAW.

ING that we have had such a short crop f hay, the following remarks, from the *Cultivator*, on the care of straw, are not priate :—

general growth of straw is also much less ual—perhaps there is very little, if any, an half the bulk that was harvested last hen we had a wet, growing season. So re two reasons for taking more than usual straw ; there is a small supply, while, in ience of the short crop of hay, more than needed. So that, in most cases, to have can be fed to advantage, and enough ding in the stables and pens, it will be ry to see that none is wasted.

care of straw comes usually in a very g time, and is often neglected. At this of the year, when other work is driving, re is no present need of straw, this por- the crop is, in many cases, not properly . But this need not be the case if proper ions are taken beforehand. In making tions for the care of straw, the first point should be to make arrangements to put as much as possible in the barns. In doing this, much depends on a little forethought. With the mows and different kinds of grain conveniently arranged, the farmer may thresh out one mow or other place of storage, putting the straw in a stack, and thus make room for the straw from the next ; and thus keep returning the straw to the last place threshed out, and so on until the barn is all threshed out, and nearly filled again with straw. At the same time, care will be taken to keep the best straw in the barn, and only put such portions out doors as are of least value to feed.

The second point, in the care of straw, is to see that all that is put out doors is well stacked. If well put up, it will be nearly all saved in good condition to use—only a portion of the outside and bottom will be unfit for feed, and that, if dried, will do for bedding ; while, if badly stacked so early in the season, it may be nearly all lost for any purpose but to rot down for manure. Hence it is very important to secure a skilful,

reliable stacker, and see that he has sufficient help to be able to do the work well.

The third point in the care of straw, is to see that there is no waste of straw or chaff in stacking. When threshing with the large separators, where the straw-carrier takes both the straw and chaff on to the stack, there is usually a good deal scattered under the carrier, that is generally spread over the yard. Where a large portion of the straw is trodden down in the yard for manure, there is not so much loss in this; but in seasons like the present, when all is needed for feeding or bedding, it is important to have it saved. If properly secured and fed in the winter, as a change with other fodder, it can be used to good advantage; being a mixture of fine straw and chaff, it is much better than the bulk of the straw; hence, it is well to have these scatterings saved. This portion of the work more properly belongs to the man that has charge of the separator, who, having little to do, can attend to it as well as not; with a good barley-fork, he may easily put these scatterings on the straw-carrier, and thus keep the floor and yard under the carrier well cleaned up, and all on the stack where it properly belongs. But if this is not done—if, as is often the case, a large amount collects under the carrier and about the stack—then the first work after the machine is out of the way should be to secure these scatterings. If put back in the barn, and fodder is short next winter, they may save some money. The cheapest fodder the writer ever bought was a lot of this description, the scatterings of two days' threshing of wheat, which, although paying what it was considered worth for manure, probably saved 10 dols. in buying other fodder for every dollar paid.

Our Library Table.

merican Entomologist. 1869.

merican Entomologist and Botanist. 1870. St. ouis.

E is a very general notion among the public that st of editor to a periodical is one that requires cial ability, but only a good share of that ad- rative power known as common sense. It is a t fallacy, and the history of the journal which ve placed at the head of this article is a striking le of it. It was made by Mr Walsh, an Eng- entleman who had settled in Illinois, and who aid no special attention to entomology until the last dozen years, when he took it up with , and amassed a multitude of original observa- chiefly bearing on economic entomology. His butions on this subject to various papers led to ing appointed State Entomologist of Illinois, again led to his starting the *American Entomo-*

The freshness, accuracy, and originality of ntributions at once procured it success. In le year he achieved a position which would been great for a popular magazine, but for ntific journal, and, above all, a journal on uch-despised subject entomology, was some- marvellous. Five thousand subscribers were on his list at the close of his first year, and its fic success was not less remarkable than its ercial. Cut off by a fatal railway mischance in ginning of the second year, the journal has been on since then by Mr Riley, his coadjutor and editor, but after three months trial we find him in help, and the Journal ceases to be the *an Entomologist*, and becomes the *American ologist and Botanist*, with the addition of a al editor; and now, after half-a-dozen numbers is health gives way, and the journal is announced suspended until the end of the year. It is to observe the difference in the whole tone of rnal after Mr Walsh's death. It is not that it well done. No article appears that might not und a place in the previous numbers—not that e not good in themselves—but it has undergone hange impossible to be described. The articles ger, the whole is prosier, perhaps more purely ic in detail, there is less variety, and a total arance of beads of fun and humour which from time belled up in the "Notices to Corres- ts," and other places, like the bubbles of gne, all *that* has evaporated, and a rather dull avy correct flatness remains in its place. A mples of the kind of pleasantry to which we allude, will enable the reader better to appreciate the way in which Mr Walsh relieved the dryness of the more technical details of the scientific articles in his journal. He was great upon quack nostrums. Here is one of his attacks on them:—"We are informed by Mr Thomas Britanham, one of the most respectable citizens of Rock Island, that he was supplied gratis by a travelling agent with a quantity of the 'invigorator' (a patent quack panacea for all the ills of fruitdom) in the summer of 1868, on the condition that he should try it upon his fruit trees, and if he thought favourably of it to 'blow' for it all he could at the ensuing county fair in the autumn. Having, he says, two or three choice grape-vines, he poured a quantity of the hell-broth over the buts of them, thinking to 'invigo- rate' them thoroughly, and also over the buts of two or three grape-vines that he set no great store by. The former were killed dead by the application, the latter still survive. Under the circumstances, he thought he was not justified in doing any 'blowing' at the fair; although, if the preparation had killed the worthless vines, and 'invigorated' the valuable ones, he might perhaps have acted differently."

Here is a notice to a correspondent:—

Singing Mice.—Mice are not insects, and as this journal is the *American Entomologist*, and not the *American Naturalist*, we cannot enter on the very singular subject of Musical Mice.

Tit for Tat.—"It is a notorious fact with all ety- mologists, that one grasshopper is capable of produ- cing thousands of eggs, which, in turn, produce the farmers' scourge—the cut worm."—*Agricultural paper.*

It is an equally notorious fact with all stock-raisers, that whenever a cow produces twin calves, one of the calves is a lamb, and the other is a roasted sucking pig.

Again—

How great wits jump together.—"A correspondent says:—That after twenty years' experience he has found that the most effectual remedy for the borer, is stopping up the holes with hard soap."—*Agricultural paper.*

A correspondent of the *Police Gazette* says:—That having had fifty years experience among horse thieves he had at length discovered, after numbers of laborious and very troublesome experiments, that the only effec- tual mode to prevent your horse being stolen. is to put one of Chubbs patent 'burglar proof padlocks' upon the stable door, after the horses have been stolen."

Speaking of the true author of some mischief, charged upon the Locust, he says:—"The Locust would clearly be justified in suing the Alton farmer for defamation of character. This is a fair specimen of the way in which persons who are not conversa with insects, often jump to con-

depredations. "Because the locust had been on the wheat in great numbers, therefore they must have caused the blasting of certain ears. 'Because the cat was in the barn when the cow died, therefore the cat must have killed the cow.'"

On measly meat he says:—"We repeat once more to all our readers—*Cook all kinds of flesh before you eat it.*—Of the many scores of persons who have died of *trichina spirales* in this county, every one had eaten either raw ham, or raw sausage, or some other uncooked or partially cooked preparation of pork. Accum, the English chemist, wrote a book long ago, which he entitled 'Death in the Pot,' but the death he spoke of arose from the adulteration of culinary articles *before* they went into the pot.' We say most emphatically, that there is 'life in the pot.'"

"In justice to a bird, whose character for honesty I fear that I have been somewhat instrumental in injuring, I ought to add here that Mr Huggins declares that, during the height of the locust season, when these insects were swarming everywhere in his orchard, he once saw a robin (American robin) catch a single locust.

"Botanists like their specimens pressed as flat as a pancake. Entomologists do not."

It is not possible for us, in the brief limits of this notice, to give examples of the serious scientific part of his work. It may be sufficient to say that it contains exhaustive accounts of all the more important insect pests of North America—the potato bugs, the wheat insects, the curious periodical cicada (or seventeen-years' locust, as it is called), the gall flies, the different kinds of bots, the different kinds of wasps, the apple borers, the cotton insects, vine insects, currant and gooseberry insects, and a multitude of others, all illustrated by a profusion of woodcuts, &c. They are thoroughly up to the scientific mark. No pretence of knowledge that does not exist—no covering ignorance with a cloud of words—but all sterling, and most of it written in a pleasant and readable style. It may very well be that one reason why the second volume is not equal to the first is, that Mr Walsh had taken the cream off the subject already. In the present state of economic entomology, while there is an nfinite amount still to be learned, it does not come all at once, and after the past acquisitions have once been chronicled, it must be hard work to supply thirty-two large pages every month with matter that will be both new and interesting. At the same time it is only justice to Mr Riley and Dr Vasey to say, that if their portion of the journal had come out not in connexion or contrast with the still more agreeable labour of Mr Walsh, we should have had nothing but the highest praise to accord them.

The *American Entomologist*, so far as yet issued, is practically more of the nature of an independent treatise on American Economic Entomology than a journal, and it will take rank as one of the best works on the subject that has yet appeared in any country.

Choice Stove and Greenhouse Ornamental-leaved Plants, &c. By Benjamin Samuel Williams, F.R.H.S. London: Published by the Author.

THIS may be said to be a second volume of a work previously published by our author, entitled "Choice Stove and Greenhouse Flowering Plants." Though much has been written and published on gardening matters in general, this portion of the field has been all but forgotten, and yet if there were three thousand authors at the time that Macaulay was writing his critique on Boswell's Life of Johnson, with Notes by Croker (what will be the extent of the army now?), out of the number surely there might have been some able enough and willing enough to get up a handy-book on ornamental-leaved plants. "But stay, indiscreet reviewers," some gentle reader may exclaim, "thou forgettest that ornamental-leaved plants form a hobby of modern times; and we are only calling out the rank and file that have been ignored in time past, to form the nucleus of an army that is being recruited, without fear of a Foreign Enlistment Act, from every quarter of temperate and tropical climes." We bow to the correction without further comment, and welcome Mr Williams' handy-book.

In this great book-making and book-reading age, when people are expected to know a little about every important topic, both social and scientific, that is passing, we are glad to see some condensing power at work to crush out the volume of verbosity, which, flood-like in its immensity, pervades the majority of subjects handled by various pens. To go into a scientific disquisition and diagnosis concerning the habits, forms, and mal-forms of "upwards of eight hundred species and varieties of plants," would occupy many good octavo volumes and the lifetime of the author besides; and could only be perused and digested by the few. When, however, we have an attempt, and a rather successful attempt let it be said, to crowd such needful information as will be of use to the million in a little 5s. handy-book, it becomes us to speak of it with respect, and examine how far it will be useful to those who devote so many minutes a-day to the delightful pastime of plant growth and plant admiration.

An insight into practical horticulture by those who wish to learn it without going through the tedious years of apprenticeship, can only be gained by practical observation practically applied. You first want to know the plant, and next what to do with it; and the simpler, less elaborate, less roundabout the instruction is written, the readier will it be understood and appreciated. Mr Williams' book is after this wise, and merits a place, therefore, as a simple technical work, on our Library Table.

Lists of plants are given suitable for the decoration of apartments for the modern sub-tropical garden, for window decoration, for dinner-table decoration, for Wardian cases, for apartments, and for halls. Our author, in speaking of window plants and window boxes, goes on to say:—

"Plants grown in pots and in boxes outside windows are, in many instances, miserable objects; on the other hand, many persons succeed in maintaining a gay and varied display in them nearly all the year round, which is ample proof that it is possible to do so if proper selections are made, and sufficient care

ntion are bestowed. Ivies of various kinds beautiful appearance when trained neatly ıe window, and form an elegant framework lants, besides having a cheerful aspect during winter months. During summer, they may ɾed, if desirable, and such plants as Pilogyne German ivy), Cobæa scandens variegata, purpose. We must, however, in passing, remind our readers that they will require occasional applications of weak artificial manure to prevent them becoming exhausted—an occurrence which would only lead to disappointment and loss of time."

The Nepenthes family is a most elegant one, many of its members, from their singular pitcher-like ap-

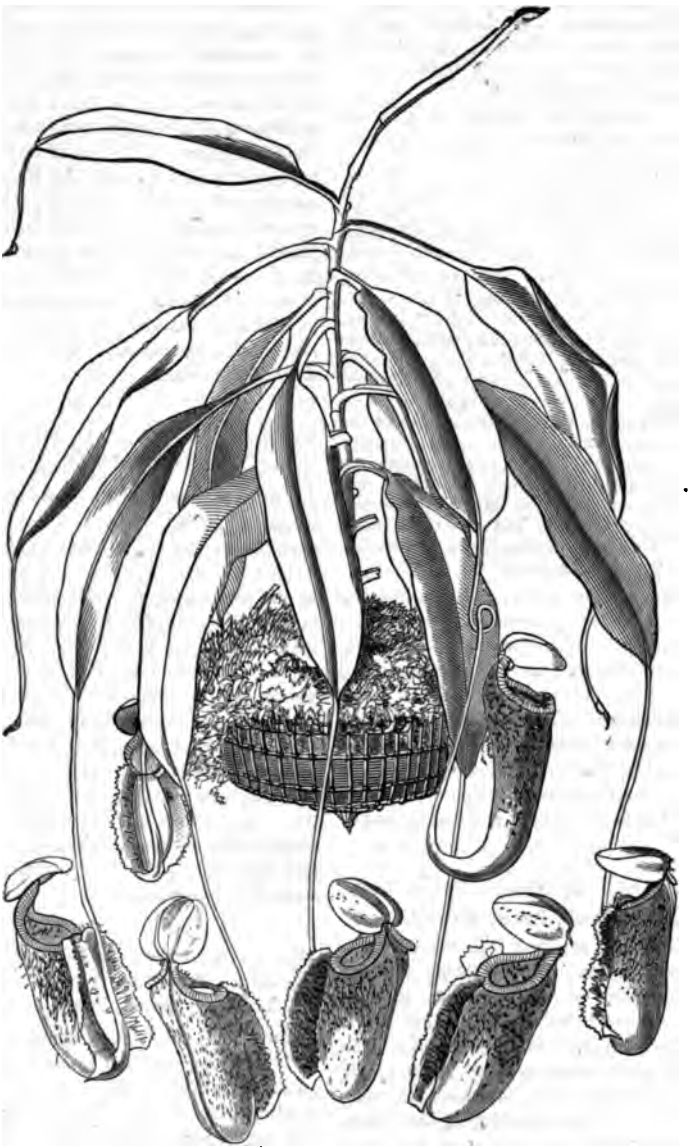


Fig. 1.—Nepenthes Rafflesiana.

ɔergia monophylla, and various other plants their place. One of the most beautiful arrangements we ever saw was a framework pon which was trained Clematis Jackmannii; consisted of Clematis lanuginosa candida ɜ same background. These and many other of this genus cannot be surpassed for this pendages, being highly suitable for warm conservatory decoration. Prominent among them is N. Rafflesiana, fig. 1, which, by the courtesy of Mr Williams, we are enabled to give. Mr Williams speaks of it thus :—

"The present species somewhat resembles N. Hookeriana in habit. The plant is very robust, the leaves large, oblong, thick, and leathery in texture,

dark green on the upper surface, paler below. The pitchers are from 6 to 12 inches in length, the lid large, margin of the mouth rolled inwards, and ornamented with an annular disc, the colour is dark green, beautifully spotted and blotched with red. The pitchers are winged in front, when produced upon leaves near the base of the stem, or upon young laterals, but afterwards they undergo the same changes as those of N. Hookeriana. It is found on the mountains of Kina Balon in Borneo, at 3500 feet elevation, and upon the mountain of Labuan, also in Sumatra, Singapore, and Malacca."

Then follows an alphabetical arrangement of foliage plants described after the following fashion. We cull, indiscriminately, from the batch:—

"Ouvirandra fenestralis.—This is popularly known as the Lace leaf, or the Lattice leaf, and is one of the most singular plants in existence. The leaves are from 6 to 18 inches in length, and from 2 to 4 inches in breadth, oblong, with an obtuse apex and spreading out horizontally beneath the surface of the water. They are of a dark-green colour, and consist of a strong mid-rib, and what would be called the primary nerves of an ordinary leaf, and these present the appearance of a beautiful piece of network, or of a skeletonized leaf; indeed, it is a veritable twig skeleton. The flowers are inconspicuous; they rise from between the leaves upon a space, which, at the apex, becomes forked, or split into two spikes, upon which the greenish white flowers are situated. If these are fertilized, and the seeds allowed to fall into the water, they find their way to the soil, and germinate freely in a short time. This most extraordinary production of Nature is a native of Madagascar."

Such is a sample of how species are described, the families to which each belong come under special description — where found—the climatal and physical conditions of natural habitat, and how their artificial home should be provided in the matter of heat, moisture, and ventilation. The whole is eminently practical, with very few inaccuracies, indeed, in the letterpress — botanical names particularly free from error, making this handy book all the more safe as an instructor in the hands of the tyro and the student of horticulture.

Cassell's Book of Birds. By Thomas Rymer Jones, F.R.S. London: Cassell, Petter, & Galpin.

WITH the exception of a very few "Cockney sportsmen" and country roughs, who wantonly slay the small feathered songsters of our hedgerows and orchards, everybody in the British isles is fond of birds. In the poorest hovels, as in the grandest mansions, you find these pretty pleasing creatures caged, not to gratify a tyrant, straining their little bills, as an over-sentimental poet would have us believe, but singing their charming notes delightedly to kind owners, as gaily from the rude wooden construction of the peasant as the gilded houses provided for them by the peer. As a rule, in fact, the poor are the keenest appreciators and shrewdest observers of the common bird-nature of our homes. There are no judges of canaries, linnets, larks, thrushes, &c., like shoemakers, weavers, tailors, and others engaged in indoor pursuits. Their eyes are scarcely ever off their forms, and their ears are ever full of their music. This is the reason, we suppose, that these classes of men are so often and so rightly chosen as judges at exhibitions of singing birds.

Cassell's Book of Birds, although it is one eminently suited for the drawing-room of the finest house for the comprehensiveness of its knowledge and the beauty of its get-up, from its wonderful cheapness comes within the means of the poorest of bird-fanciers, and besides telling them all about the birds with which they are acquainted, it gives them interesting descriptions and drawings of foreign ones which they never saw. Only one volume of the four of which the work is to be composed has been issued, but if we may take it as a criterion of the rest, we can safely recommend our readers to purchase it. The letterpress is concise, yet full, and the plates and woodcuts are accurate and clear. It is the very book for the library of the farmer and the country gentleman, as it will afford both interest and instruction to old and young. The text, it should be mentioned, is from the eminent ornithologist, Dr Brehm.

The Book of the Farm. By Henry Stephens. Edinburgh and London: William Blackwood & Sons.

THE seventh part of the new issue of this exhaustive work on farming, which against all comers in the agricultural line, maintains its place of pre-eminence, has reached us. We need not say that it ought to be in all farm-houses, for all reading farmers know this, and now that it is placed, by the method of publication, within easy reach of all, those who have it not should get it. It would be well, however, if the editor would look at the illustrative cuts. Instance the toothed sickle, page 296. It does not seem to be much serrated. And, again, we should have liked to have had a fuller account of reaping machines, which have wrought such a change in the harvesting of this country. We cannot call the notice of these time-and-money economizers in this part, other than meagre, and should like to see the account supplemented in some future numbers.

Wonders of Animal Instinct, with Illustrated Anecdotes. From the French of Ernest Menault. London: Cassell, Petter, & Galpin.

THIS book will, we feel confident, prove a very nice and interesting addition to our stock of literature, instructing and entertaining to youth. The manner of treating and placing the various subjects, and of relating the pleasing anecdotes in connexion with them, reflects great credit on the editor. The following extract, with reference to canaries, gives a fair idea of the kind of reading the book affords:—

"How can any one say that the canary is devoid of sense? Is there a form more animated, a brighter eye, or more charming little head, than that of this lively bird, whose structure is so delicate, colour so soft, feet so slender, and movements so grace-

The canary is all gentleness and viva-
Our favourite canaries are nearly always
, tame, good-tempered, sweet in disposition,
iusbands, tender fathers, and naturally happy.
heer their mates incessantly by their singing,
them in the labour of hatching, and take their
for several hours during each day; they also
feeding the young ones, and in teaching them
: is necessary.
proportion to the weight of their body, their
ppears more developed than that of man.
iese birds are very docile and teachable. They
r aside their own natural melody to take up the
ıy of our voices and instruments. They can
› whistle, and even to speak. The facility with
they learn different kinds of performances, is
r proof of the docility of their intelligence. We
een some at a fair which went through their
es with the precision of old grenadiers."

volume is handsomely bound, beautifully
, and profusely illustrated with engravings of a
r character.

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on Mushrooms. By W. Robinson, Author of
pine Plants," "The Gardens, Parks, and
nenades of Paris," &c. Warne & Co., London.

uthor's reasons for publishing this elegant and
work are stated in the preface, to wit:—"That
ıoms are but little cultivated compared with
ıey ought to be, considering the high appreciа-
which they are held, and the abundance of
ıls available for their production; that a
mode than the one usually practised is pos-
nd desirable; and further, that our present
of production are confined to too narrow a
"

author, therefore, proceeds to set forth other
ıeaper methods, and to inform all whom it
ıncern, how to save their bills for spawn by
ıg the Parisian method of germinating the
in beds specially prepared for that purpose.
book is beautifully got up, and profusely illus-
and contains everything useful to be known, from the collecting of virgin spawn to the cooking and enjoying of choice mushrooms throughout the year. We have pen and pencil sketches of the best French and English methods out of doors and in-doors, peeps at all the processes from spawn making to mushroom gathering in French caves, English houses, cellars, and out of doors. In the course of a dozen chapters, the whole subject is treated exhaustively, and in the author's usual clear and lucid style. As we shall, probably, frequently make excisions from the work, we shall content ourselves at present by quoting the contents.

In glancing hurriedly through it, we have formed a very emphatic opinion to the effect that no one of ordinary intelligence need ever be without mushrooms with Mr Robinson as their guide. On the first pages the author answers the question, where mushrooms may be grown, thus:—

"In proper mushroom houses, sheds, cellars, outhouses, stables, railway arches, in deep caves, in the open air, in gardens or fields, or prepared beds, in gardens among other crops, and in pastures where the mushroom is not already established."

The 1st Chapter treats of Mushroom Culture in the Mushroom-house; Chapter 2, On the Preparation of Materials; Chapter 3, Mushroom Spawn; Chapter 4, Spawning and after Treatment; Chapter 5, Culture in Sheds, Cellars, Arches, &c.; Chapter 6, The Parisian Cave Culture of Mushrooms; Chapter 7, Culture in the Open Air, in Gardens and Fields; Chapter 8, Culture in Gardens with other Crops; Chapter 9, Culture in Pastures; Chapter 10, The Common Mushroom; Chapter 11, Modes of Cooking; Chapter 12, Some of the most Common and Useful Edible Fungi.

These are fully described and beautifully delineated. Such is the bony skeleton we have picked out of the book for our readers. If they wish to cover them with the firm, sweet flesh of mushrooms, they have only to consult the book for themselves to find it most pleasing and instructive reading.

Papers by Tim Bunker.

TIM BUNKER FROM HOME.

ROCK VILLA, *February* 21.

I KNEW that you could not get my letter in time for last month, and so was in no hurry in dating it. Rock Villa is a place about which you probably know nothing whatever. The chances are that the readers of THE COUNTRY GENTLEMAN'S MAGAZINE have heard about villas, that many of them have villas of much importance of their own. But the villa of which I am speaking is not of the character that villas generally are.

Rock Villa is a large farm, it is occupied by a man who owns the land which he tills. He is a man, I assure you, Mr Editor, who might even give Tim Bunker a wrinkle—that is, because Tim thinks that the Squire has read some of Tim Bunker's letters. I am not now going to tell you what that Squire's name is (I shall enlighten you after); but after many inducements on my part to draw him out, after many instances that might almost have appeared rude, I came to the conclusion that the Squire is not prepared to make his report about the education of farmers. His mind is evidently not clear on the subject. He does not like to take the ground that education spoils a man for being a farmer; but he is inclined to think that if you give a young man a good education, he will not be very likely to stay on the farm. The truth is, this question has thrown the Squire off his bearings. He has an idea that farming is a very profitable business. But when you bring him right down to facts and figures, he plays shy. The Squire has lived on his present farm nearly forty years. He commenced with nothing, and is now well off. He has enjoyed good health and the respect of the whole community, has lived very comfortably, and given his children a good education. But for all this, the Squire, in his heart of hearts, does not believe in farming. Talk to him, and he will tell you that his farm will pay the interest on £50 an acre. But he will sell for £40. He has always been willing to sell—always expected to sell; and this is one of the reasons why he has not underdrained his farm. He has observed that purchasers prefer to make their own improvements, and are seldom willing to pay even the actual cost of improvements already made. The Squire is a scrupulously honest man—a man of undoubted veracity and honour. He would deceive no one; but, you know, when even the best of men have anything to sell, they neither tell all its faults nor conceal all its virtues. Human nature is human nature, and there is a good deal of human nature about the Squire. He wants to sell his farm. Can we expect him to tell an intending purchaser that farming is up-hill work? Should we not rather expect him to give a rose-coloured view of the pleasures and profits of farm life? If a man from the city talks of moving on to a farm, can we blame the Squire if he tells him—and tells him truly—that the country is the place to bring up a family; that fresh vegetables and ripe fruit are wholesome and delicious; that a new-laid egg or a broiled chicken is very good eating; that it costs a great deal less to keep a horse in the country than in the city; and that sweet cream is a great improvement to a cup of coffee? Can you expect him to say that, in his opinion, he will not have half the luxuries in the country that he has in the city; that his wife will detest farm life; that his city friends will deride him, and his farmer neighbours cheat him? It would not be polite to tell him all this. No; if some lawyer orator, at an agricultural fair, paints a charming picture of country life, the Squire

approval. It may help him to sell his
And is it not true that 75 per cent. of
: farmers in the United States would
ıeir farms to-day if they had a chance?
ıre they not consequently inclined to
:rate the profits of farming?
w many of our farmers have any real
n their business? Even the Squire will
t the agency of a new reaper, or will
own grass get too ripe, while he goes
ʒ his neighbours to sell mowing-
nes, or to introduce a patent steel-
:d rake. Many a farmer actually feels
ed to be asked by some city grocer to
utter for him. And we know a success-
rmer who gave up his farm to accept
gency of a sewing-machine company,
:vidently thought it a great thing to be
to wear his Sunday clothes throughout
eek, and to drive about the country in
gon marked in large gilt letters, "John
, Agent for ——— Sewing Machines."
hought he had ascended several steps
e social ladder.
mers are not altogether lacking in con-
ıeither are they absolutely destitute of
and self-satisfaction; but they have
pride in their calling. There are, of
e, many exceptions, but, as a rule,
rs do not think their business either a
rofitable or a very honourable one.

A short time since, we were busy writing when the servant announced that "there is a gentleman wishes to see you." "Shew him in," we said, and kept on writing. As is usual in the country, he wished us a good morning, and then informed us that we were having delightful weather for the time of year, though the roads were pretty muddy, and it looked a little like snow, and that he thought it probable that winter would set in before long. Getting no response, and detecting a look of impatience, he asked:—"Have you any oats to sell?" "Yes; about 700 bushels." "What do you ask for them?" "Four shillings." "Is not that pretty dear?" "I will not sell them for less." "Well," he said, "I will take a bushel, if you will take it out in trade." He was a tin-pedlar. We did not wish anything. Well, he would pay cash. We did not think it would pay to go to the barn to weigh out 1 bushel of oats. He said he would take 2 bushels if we would let him have them for 7s. 6d. We finally convinced him that we were not in the retail trade, and could not afford the time to wait on him. He left, muttering to himself, "Farmers are getting awfully stuck up now-a-days."

The incident shews merely the estimation in which farmers are held, even by rag-dealers and tin-pedlars.

The Garden.

CONCERNING LAWNS.

THERE is little danger of over-estimating the importance of the lawn. It is the latest flower of horticultural civilization. First comes the kitchen garden, then a few lilacs and roses, then a border for pinks and marigolds, then apples, pears, gooseberries and currants; then a further addition to the flower garden, and, finally, ornamental trees and shrubs and well-dressed lawns.

Those earlier comforts and embellishments are all very well, but they alone do not fill out one's idea of a complete country residence. It is only a few years since it was customary, in places of considerable pretension, to devote a large part of the "front garden" to flower beds, laid off in various geometrical patterns. A better taste now prevails, which disposes the flowers in a side scene, or drops a few of them here and there by the side of the footpaths, and devotes the larger portion of the ground to a carpet of smooth grass. It is difficult to keep flower beds in perfect order at all times, and even in their best condition the eye tires of their daily view sooner than of a simple, quiet lawn. The prevailing expression of the grounds of a country villa should be that of repose; and that expression is interfered with if they are devoted largely to flower beds. The flowers themselves are gay and exhilarating, and the sight of extensive parterres suggests thoughts of the time and labour necessary to keep them in good order.

A good lawn possesses an air of refinement, it distinguishes the ground at once from the uncultivated wildness of nature; it speaks of the hand of taste which has fenced in this chosen spot from the common earth, smoothing down its roughnesses, heightening ts native beauties, and still guarding it with affectionate care. Its grasses are not the coarse herbage of the hay-field, but those finer growths which form a velvet sward, are soft to the foot, and pleasing in colour and odour. Its trees are not the tall, half-naked denizens of the forest, nor even the better products of the pasture and meadow, all trimmed up to "browsing line;" they are symmetrical in form, ample and luxuriant in foliage, their branches, guarded for long years from injury, now rising unbroken from the sod to their crown. Its shrubs have been culled from many a clime, and brought here to shed their varied charms of form, colour, and fragrance on this chosen scene. We hardly know whether such a lawn is more beautiful by sunlight or moonlight. But at either time, its broad, luxurious reaches of turf, broken here and there by tree shadows, and perhaps enlivened by children at play, form a scene on which one always delights to look.

Not the least argument for lawns is the permanence of their beauty. In spring the grass shoots up almost as soon as the snowdrop and crocus appear, and if the ground has been well prepared, the sod in midsummer is almost as green as in spring. The winds which despoil trees and flowers of their beauty, and the frosts which blight them, leave the grass unharmed. And in autumn, amid falling leaves and prevailing gloom, it retains its cheerful verdure until hidden by the winter snows.

How, then, can we make a good lawn? Certainly, it will never come by accident. It is a work of art, and can be had only as the product of thought and labour.

In the first place, care should be taken in the choice and preparation of the soil. A strong clay loam is better than sandy land.

The latter should be avoided, if possible; but where it must be used, it should be dressed heavily with clay, and the whole mixed together with plough or spade.

Are there any wet, springy spots in the chosen ground, or is the subsoil cold, stiff, and retentive of moisture? If so, it must be drained; for the finer grasses will not thrive in a wet soil; and whatever trees and shrubs are set out upon it, will lead only a miserable life, if they do not die at once.

Hardly less important than this is trenching and manuring. The principal reason why so many lawns turn brown in summer is, that the grass has so thin a surface-soil in which to extend its roots; and as this becomes soon dry, the leaves of necessity wither. Deepen that soil to 18 inch 2 feet, and the grass, having sent down its roots into the moist earth below, will flourish in perpetual green. Manuring must go along with trenching. Nor is it enough to enrich the surface; for while this may cause the grass to grow vigorously in the spring, it will not ensure its freshness throughout the summer. Incorporate the manure finely with the whole body of the soil, and this will both improve its mechanical texture and furnish food to the grass.

It is hardly possible to exaggerate the importance of this preliminary work. It is the foundation of our building. Draining, trenching, manuring—if either of these is neglected, all our subsequent work will be unsatisfactory. And yet just here the most grievous mistakes are continually made. Our amateur "rural improvers" expend most of their time and means in building showy houses, stables, and fences, leaving only a pittance for the preparation of their land for gardening uses. If they dig the ground, they do but scratch it; and consequently the grass-seed sown upon it comes up in patches and turns brown in summer, and the trees and bushes do not thrive. Only let the work upon our lawns be thoroughly done, and we need seldom sigh for the weeping skies to keep them verdant.

The ground having been well broken up and enriched, it should be raked finely, removing all stones, lumps of earth, and roots of weeds. Then, if the space be large, sow it with grass-seed. "Lawn-grasses," variously mixed, may be bought at the seed shops. The old practice of seeding down with some grain crop is now wisely discarded, and grass-seed is sown alone.

If the lawn is small, it may be covered at once with turf, cut from good old meadow land. Care should be taken, however, to select turf free from weeds and coarse grasses.

In cutting turf from a meadow for the lawn, stretch a line across the turf, and with a sharp spade, cut the sods into strips 1 foot wide, and 2 or 2½ feet long, roll them up, and carry them to the spot where they are to be used. Then begin on one side of the lawn to unroll them, matching the edges neatly, as a lady does her carpet, until the surface is entirely covered. Go over the whole with a turf-beater or an iron roller, and the work is done.

But a lawn, however well made, will not take care of itself. It must be mowed once in ten days or a fortnight, and should be rolled after every rain or heavy shower. If rolled just before each mowing, it will press down ant-hills and worm-casts, which are apt to dull the edge of one's scythe or mowing machine. It is no light achievement to mow a grass-plot short and smooth; and, in the absence of mowing machines, nothing is better for this purpose than the lawn scythe. But the improvements recently made in lawn-mowers leave little to be desired in this regard. We now have them of various sizes, from the large machine, drawn by a horse and cutting a swathe 42 inches wide, down to the small ones, cutting 16 and 12 inches wide. These machines roll the lawn as well as mow it. Some have boxes attached, which gather up the grass as fast as it is cut; or the boxes may be removed, and the cut grass is scattered evenly over the surface, where it can remain, answering the double purpose of a mulch and a fertilizer, as in the case of the Archimedian mower.

That the margins of the lawn next to the gravel-walks, flower-beds, and carriage-ways, should be neatly trimmed after each mowing, and that the walks themselves should be kept in perfect order, we need hardly say.

FLOWER GROUPS IN GARDENS.

I PURPOSE giving a few examples of these. Beauty of outline is not all that is needed to please the eye, but it is a major part of it. Even the diamond gains much from the setting, and so do flowers. True, the diamond is bright, the flower beautiful anywhere. But the former is never so bright as when it flashes forth from the brow of beauty, the latter never so charming as when it looks up at us from a chaste elegant bed, cushioned round with green grass, and set in any framework of spotlessly bright sparkling gravel.

The following sketches have the merit of being easily transferred from paper to ground, which is of importance to all gardeners. With a large pair of compasses, made with two sharp-pointed sticks, say 2 feet long, for legs, and a bit of stout string to graduate the distance of the two legs at pleasure; all these may be as easily drawn upon the ground as upon paper. The scale is enlarged, that is all. The most convenient mode of proceeding is to draw a straight line with perpendiculars, proceeding across to the points of the side figures, and then work from these. However, if your readers find any difficulty, I shall give further instructions. At present I hasten to lay before them a few examples, which, I hope, may prove useful to some, and excite the interest, and the critical acumen of all.

Fig. 1 illustrates a simple mode of furnishing the centre of a ribbon. It breaks up the monotony of straight lines, by the easy flow of curved ones. The effect of both is heightened by the contrast, just as the harmony of the sweetest instrumental music is enriched and mellowed into a softer sweeter melody by the addition of the human voice, or the distant murmur of falling waters. The centre figures may be of any form in this style, so long as the lines are curved. Some prefer circles to ellipses, and others more intricate figures. Others cut the centre into diamonds, squares, or parallelograms. In the latter the beauty of the centre is lost, and the contrast between the centre and straight lines bounding the sides is not so striking. Diamonds, however, often look

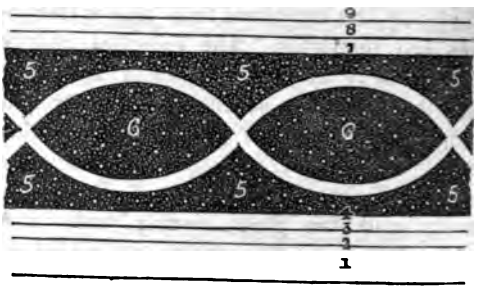


Fig. 1.—Design for a Ribbon Border.

well. But, upon the whole, few arrangements of this kind are more effective than fig. 1. The curves are easy and full of grace, and the spaces large enough to fill the eye satisfactorily, with the different colours. The following refer to fig. 2 :—

1. Gravel walk.
2. Alternanthera amœna.
3. Lobelia speciosa.
4. Cerastium tomentosum.
5. Verbena Purple King.
6. Pelargonium Spread Eagle.
7. Pelargonium Christine.
8. Pelargonium Stella.
9. Calceolaria amplexicaulis.

The waving lines may be formed of Coleus Verschaffeltii and Golden Feather crossing each other. Scarlet and white pelargonium, Iresine Lindenii, and Lady Cullum pelargonium; Centaurea and Purple King verbena or Cerastium and Lobelia speciosa. Violent contrasts between the two lines are the more striking, though there are cases when a single colour, either very bright or of a neutral tint, is more chaste and beautiful, as enclosing bands to the central figures.

Fig. 2 is a very effective, and now rather

ommon design. It is most beautiful sunk a a panel composed of glistening silver sand,

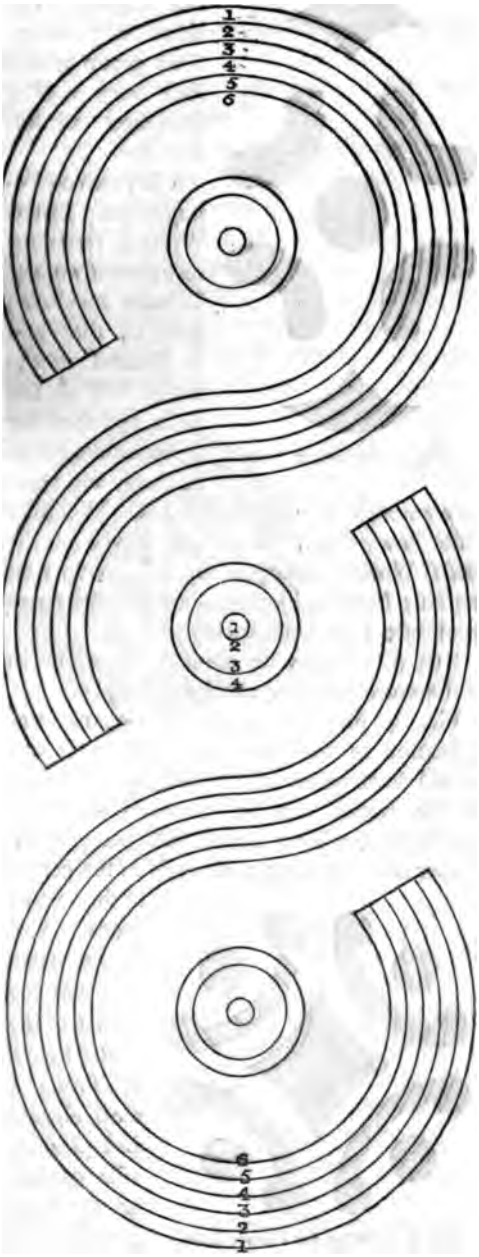


Fig. 2.—Design for Planting a Parallelogram.

nd clean white or bright red gravel, the dgings of the panel, and the surroundings eing of grass. In such figures every line of

beauty must be perfect in curves and in furnishing. The same height and breadth should be preserved throughout. Each line should likewise balance, as it were, with every other. Here is an example of the mode of furnishing the beds in fig. 2, viz., for the upper curves—

1. Lobelia speciosa.
2. Pelargonium Lady Plymouth.
3. Coleus Verschaffeltii.
4. Yellow calceolaria.
5. Purple King verbena.
6. Cerastium tomentosum.

For the Circle—

1. Humea elegans.
2. White fuchsias.
3. Amaranthus melancholicus.
4. Centaurea ragusina.

For the lower curves—

1. Variegated Alyssum.
2. Pelargonium Harry Hieover.
3. Pelargonium Flower of Spring.
4. Coceus Verschaffeltii.
5. Yellow calceolaria.
6. Lobelia speciosa.

When all the circles are filled alike, the eye rests with greater complacency on such lines

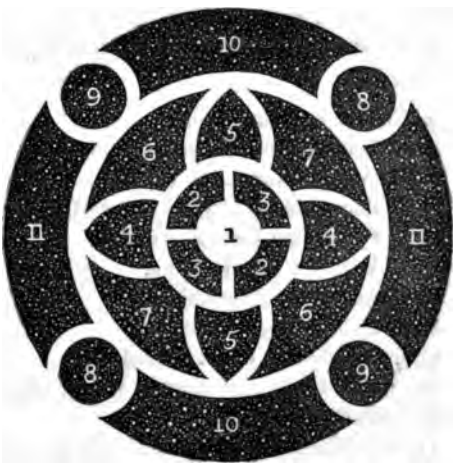


Fig. 3.—Design for Small Garden.

nestling round centres of uniform colour. Nothing, however, is easier than to make each bed different from the other if preferred.

Such centres are also frequently furnished with one variety of plant only. The variegated pelargonium is admirably adapted for such position. Any of the best golden and silver tricolors, forming rich and beautiful centre pieces, either by themselves, and tied round with a ribbon of Lobelia speciosa, or some of the brilliant Alternantheras.

For complete flower gardens for villa residences, or single groups of figures in larger gardens, or for a rosary, fig. 3 is well adapted. This might be adopted for almost any garden. It is a simple figure, and yet offers considerable variety of form in a small space. One great evil—a redundancy of sharp corners, is likewise reduced to a minimum. Such groups are generally most pleasing when the beds are furnished in pairs. The eye is constantly demanding a balance, and when it fails to find it, is apt to wander on dissatisfied. But if preferred, of course every one can be filled differently, or with two colours—a mass with a fringe or contrasting-line may be planted in each bed. But I do not counsel this course with small beds. Nothing fritters away pleasing effect more effectually than narrow lines of colour scattered about everywhere, and sufficient breadth for repose found nowhere. In accordance with these principles we purpose, in this instance, to edge only the four largest outside beds.

1. Coleus Verschaffeltii.
2, 2. Pelargonium Flower of Spring.
3, 3. Pelargonium Lady Cullum.
4, 4. Pelargonium Crystal Palace Gem.
5, 5. Pyrethrum Golden Feather.
6, 6. Verbena Purple King.
7, 7. Ageratum Imperial Dwarf.
8, 8. Coleus Queen Victoria.
9, 9. Calceolaria aurea multiflora.
10, 10. Pelargonium Spread Eagle, edged with Centaurea ragusina.
11, 11. Mangle's variegated pelargonium, edged with Purple King verbena.

The next fig., 4, shews a smaller group, which is adapted for a small garden. It looks well on any scale, and the beds are readily and easily furnished. If there is not sufficient space for the two end beds, they may be dispensed with, or small circles may be substituted for the angular sections of circles. This group would look very well if furnished as follows :—

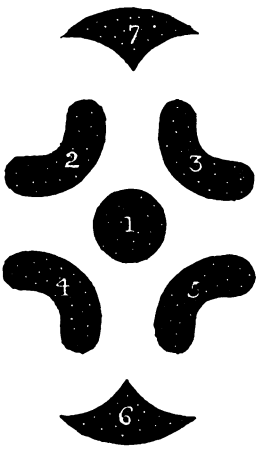


Fig. 4.—Group of Beds.

1. Ivy-leaved Pelargonium Bridal Wreath, reclining on a groundwork of Lobelia speciosa; that is, the bed is planted moderately full of Lobelia, and then the pelargonium planted thinly and regularly amongst it all over the bed. The pure white flowers and fine green leaves of the Bridal Wreath pelargonium thus recline on the blue Lobelia, like large-headed silver pins stuck into a blue silk cushion.

Nos. 2 to 7 may be planted the same as in the corresponding numbers of fig. 3.

Fig. 5 may be called an elegant amplification of the preceding group. It can be laid down either with or without the circles, or the circles can be removed from the middle of the long figure, and placed at a proper distance from their ends in the centre of the vacant space, and in an exact line with the points of the centre figure. It forms a most elegant and pleasing villa garden, or detached group of figures, and scarcely any design could be more appropriate for a rose garden. There are no sharp angles, and the easy sweep invites one to go round and examine each sweet flower. Grouped

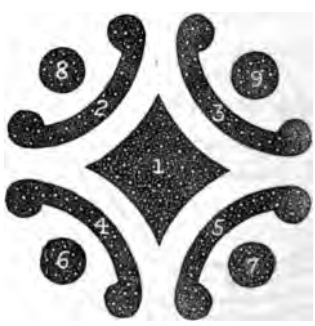
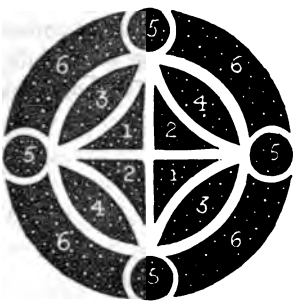


Fig. 5.—Design for Flower Beds.

ith modern bedding plants, it would look ell filled as follows :—

1. Golden Feather, edged with Amaran- ıus melancholicus.
2. Pelargonium Spread Eagle, edged with hite verbena.
3. Pelargonium Christine, edged with urple King verbena.
4. Lady Cullum, edged with lilac verbena.
5. Pelargonium Bijou, or Italia Unita, lged with scarlet verbena.
6. Coleus Verschaffeltii.
7. Coleus Berkleyii.
8. Coleus Queen Victoria.
9. Coleus Her Majesty.

Fig. 6 needs little comment. Its elegance, compactness, and simple beauty commend themselves. Who would not like to have it in front of their drawing-room window? And in what position could it fail to please? The beds would look well furnished



ig. 6.—A Circular Group of Beds.

ıd attractive in pairs, with the following lection of plants :—

1, 1. White verbena.
2, 2. Verbena Scarlet King.
3, 3. Mangles' variegated pelargonium.
4, 4. Pelargonium Lady Cullum.
5, 5, 5, 5. Pyrethrum Golden Feather.
6, 6, 6, 6. Clipper, Lord Derby, Amy ogg, and Persian pelargoniums, each bed one variety.

In a small group like this, it may often be ell to have each bed a distinct sort. But in ırs, or in fours, the eye is generally better tisfied.

Our last group at present (fig. 7) is of a fferent kind. It is an example of long uares, with diamond ends and diamond ds, to please those who are enamoured th sharp corners. The centre is here ewn as a circle; but where perfect uniformity is desired, that may readily be converted into a large diamond-shaped bed. I cannot recommend this form; it is difficult to furnish the sharp corner, and unless they are remarkably well filled and carefully kept, they

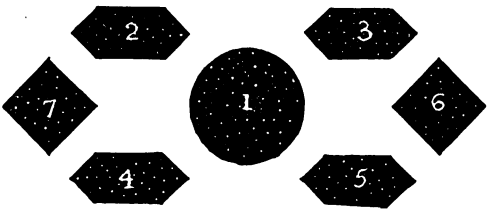


Fig. 7.—Design for Flower Beds.

are eminently unsatisfactory. Still, they are popular with those who carry architectural stiffness into the garden, to such extent as to contend that no curved line should come within a wide radius of the straight walls of the house.

The following mode of filling might be adopted :—

1. Coleus Verschaffeltii.
   Second row.—Calceolaria, edged with Purple King verbena.
2. Mrs Pollock pelargonium.
3. Italia Unita.
4. Flower of Spring.
5. Lady Cullum.
6. Amaranthus melancholicus.
   Second row. — Centaurea ragusina, edged with Lobelia speciosa.
7. Tall plants of Bijou pelargonium.
   Second row. — Ageratum Imperial Dwarf, edged with Golden Fleece pelargonium.

These examples of garden groups are not offered as either perfect or original. They are suggestive merely of what ought to be done. Most of them have been tested by experience, and found well adapted for the purpose of exhibiting beauty on a pleasant basis. All are simple and easily laid down. This simplicity is a great, perhaps the chief, point. All elaborate patterns, which give more prominence to the design than its furniture, should be avoided, especially in small gardens. They are troublesome to put down,

expensive to keep, and an attempt at some unattainable object. So large a flower garden in one spot is to be avoided. It makes a flash of light, and all is dark beyond. It is better to have two or three small groups or single figures than one large one. Thus visitors are charmed as they walk through the grounds, with a gradual unfolding of grace and beauty. On the contrary, when all the flowers are brought together in front of the house, one is almost blinded with the glare of a first sight, and all is dull and uninteresting beyond it. A small group here and there, or a single bed now and again as a surprise, and as satisfying the eye all round, is much more pleasing.

LOOKER'S PATENT PLANT COVERS.

CHEAP and useful is the verdict we can award to the variety of plant covers that Mr Looker has submitted to notice. Cheap, because the principal portion of the frame-work is made of earthenware, and useful because it answers the conservative purposes intended, with a minimum risk of breaking the glass covering. We submit a variety of the designs to our readers, allowing them to judge of their utility for themselves. Anything to be cheap, without serving the purpose intended, is a mere toy. As a rule, we don't believe in over-cheap articles, as they turn out in the balance-sheet of a ten years' retrospect to be wonderfully dear to the purchaser. The merit of consulting true economy lies in the adaptability, combined with the durability of the article, of whatever kind designed, for useful purposes. If these frames were not as protective in their character as the usual hand-lights, even supposing they were cheaper to begin with, our readers don't require to be told it would be no economy to purchase them. But, for

Fig. 1.—Patent Plant Cover.

ately for the patentee, and equally fortu- e for the public, they are so; and, while y afford equal protection, under similar :umstances, to any description of glass- ction and covering, the frame-work is so ıstructed that it can be displaced at plea- e without disturbing the glass, as will be n at fig. 1. The wooden frame-work at ridge is a fixture; but there is a sufficient :ning between the two longitudinal beams

Fig. 2.– Propagating Box.

ıdmit the passage of air, which is again ffled up with ornamental earthenware ıs, which are displaced or replaced in a e. Again, arrangements could easily be :cted, if it were necessary, to have ventila- ı from the sides, by having openings in the 'a-cotta chairs or slabs; but that is seldom :essary if the frame were intended for a und vinery, or even for wintering bedding nts, or for forcing vegetables, or for the ıg of it in the many ways which suggest mselves to every gardener. With such :sire on the part of manufacturers to pre- t cheap erections to the public, no one d be without some, to assist in the various artments of fruit, flower, or kitchen gar- ing.

'igs. 2 and 3 are propagating boxes made of earthenware, and groved to admit a square of glass to slide up or down, as required. Such boxes serve a great variety of purposes for propagation, both out- and in-doors, as well as being useful for protecting vegetables over winter, and for strengthening even the hardy members of the Brassica and lettuce tribe, which are always additionally palatable if they can be provided a little earlier than usual in spring. What is of some importance, they are not large in dimensions, and therefore all the more suitable

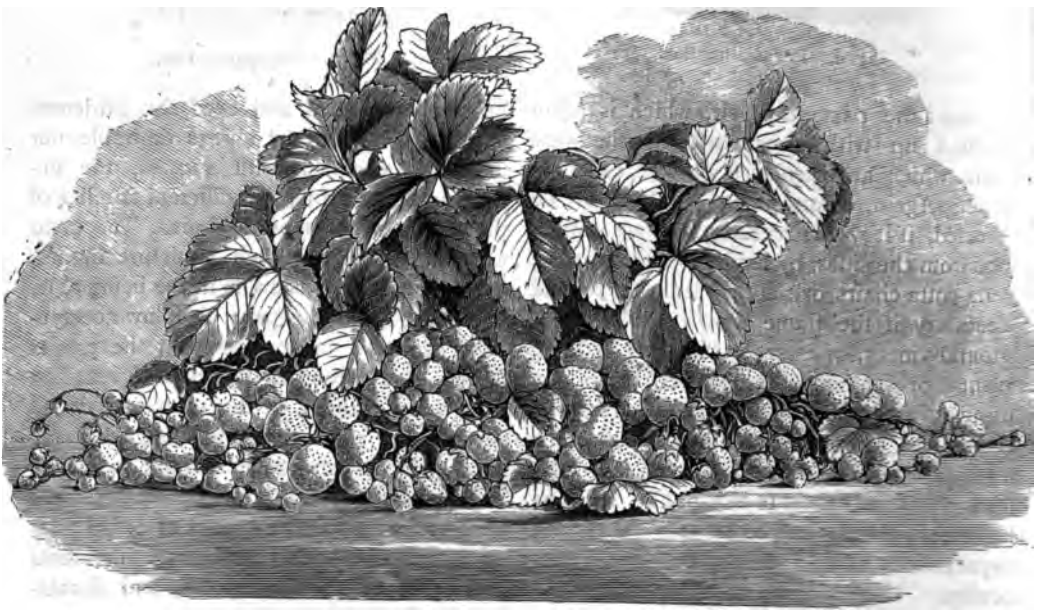
Fig. 3. –Propagating Box.

for small gardeners, and even for gardeners in general, as it is not always desirable, nor uniformly attended with success, the endeavouring to propagate different families of plants in a common atmosphere. The great advantage of some such miniature frames, as our engravings shew, is in the being able, by sliding down the pane, to allow accumulated moisture to evaporate at the proper outlet. It is wrong in principle to ventilate from below without having means to do so from above; hence the disadvantage of hand-lights, cloches, and such air-tight mediums. In fact, Mr. Looker's boxes are neither more nor less than miniature frames of olden principle, but adapted to modern requirements in respect of size, cheapness, and durability.

NEW AND RARE PLANTS.

BROWN'S WONDER STRAWBERRY.

"WHAT a wonderful, prolific-fruiting variety of strawberry this must be!" we apprehend is the general exclamation on looking at the engraving, for which we are indebted to Messrs Child & Lorimer. Nothing we have seen can at all compete with it for garden purposes, if it be true to book, and we have every reason to believe that it is so. If we had any doubt at all, it is set at rest by the very open remarks of our esteemed correspondent, Mr Lorimer. After stating that it was raised by a market gardener, well-known to the firm, Mr Lorimer proceeds to remark that "its flavour is in the way of British Queen, and not at all allied to the Hautbois, as some have supposed. The block is a faithful representation of a photograph in our possession, and which was not taken with a view to trade purposes, but simply to satisfy the curiosity of the raiser, who lifted a plant and drew all the fruit to one side for that purpose. As another proof of its prolific qualities, he has discarded all other varieties in favour of his own, as he finds none other will bear comparison with it in the weight of fruit it bears. I mention these facts because I find there is a suspicion that the photograph has been got up merely to make it sell—an idea which is utterly without foundation." Our readers can judge for themselves. We are inclined to give it a trial, and shall report upon it when we have done so.



Brown's Wonder Strawberry.

NEW CRIMSON-FLOWERED GIANT MIGNONETTE.

When our readers are beginning to think over what they should sow for summer and autumn flowering display, it is well to notice such novelties as are likely to yield some pleasurable return. Foremost among plants reared from seed for dispersing that agreeable fragrance that is so delightful in the cool of the evening, or when moistness prevails, stands the mignonette. It is everybody's

avourite, and in no place is it more prized han in boxes on the outside window-sill of villas or mansions, or even in the small window recesses of those quaint-looking, but comfortable whitewashed cottages that are so studded over the country. But there is mignonette and mignonette, the small flowering and small growing as well as the larger flowering and the larger growing strains. When one buys a packet of seed, therefore, even supposing it should cost 6d. more, it is well to get the best. Messrs Carter & Co. have been at some considerable pains in securing a very excellent strain, an engraving of which, by their permission, we are enabled to present to our readers.

New Crimson Mignonette.

Centaurea Clementei.

It is described by them as the best variety in culti-

vation, distinct from all other sorts, very robust in habit, with very large spikes of handsome flowers, of exquisite fragrance, and is a free and perpetual bloomer. It is cheap to buy, and worthy of a trial.

CENTAUREA CLEMENTEI.

Here we have a charming novelty among the extensive order of Campanales. We have been so much indebted to this family for beautifying our parterres in summer, and our greenhouses and conservatories in winter, that any addition to its members is eagerly scanned, and, if of the right stamp, anxiously prized. Those who know the beautiful C. ragusina, and its fitness for flower garden decoration, can fully estimate the value of our remarks. And then, when we have a plant of something the same character with foliage even more prominently pinnatifid, and gracefully arching in an opposite direction from the hoary stem, it becomes us to welcome it with a good grace. The Messrs Carter introduce it to notice with the following description; and, with their permission, we present the engraving:—

A plant of robust growth, with large crowns of leaves, which are deeply serrated, and cut in lobes, which are again serrated and cut. To the elegance of the foliage must be added the beauty of colouring, the leaf in a young state being covered with down as white as snow, and when fully matured and developed, still retaining a silvery appearance. Similar to the well-known C. ragusina, but superior in all its proportions, it will occupy the position of the first rank as a foliaged bedding-plant, or as a plant for general decorative purposes.

Work in the Garden during March.

From "THE VILLA GARDENER."

MARCH is one of the most trying months in the whole year for gardening. It often proves the grave of our brightest hopes, and ruins, in a day or night, the golden promise of the year. Who has not heard of a bull in a china shop? We may easily fill in the picture of ruin and desolation he would work. With tail erect, bellowing tongue, snorting nostril, butting head, and heavy trampling foot, smashing, crashing all, behind him a wild scene of havoc and ruin. Before him all was peace and quiet beauty, in his track a wreck of useless potsherds. It is thus that March sometimes sweeps down upon our gardens. Before his advent all is fair, delicate, tender, beautiful. But his track is marked by a frost trail, black with ruin and death. As far as we can prevent it by our skill and care, we should see to it that March has little tender growths to lay hold off. No previous weather should make us forget his coming. March, with its usual boisterous biting winds, and dry piercing frosts, will certainly come, sooner or later—the sooner the better for us. It seems to come as a rebuke to the early flowers, and a warning to impatient leaves and tender growths out of doors. He delights to wrestle with and try the strength of every living thing. His fierce winds seem to challenge leaf, and blade, and blossom, to a wrestling match; and woe betide the tender plant or fruit that tries his rugged strength. Our native plants seem quite to understand that March is coming, and they are coy of opening their leaf or flower buds till he has come and almost gone. But the peach, the apricot, and French or Flemish pears, are not so wise. The first gleams of sunshine seem to remind them of their summer homes, and they rush out of their winter water, and almost frost-proof coats, to meet and welcome the warm shining of the sun. This sudden impulsive action too often proves their ruin. The cold winds of March freezes their blood, curdles the sap, and they die. But those who are to the climate born keep on their scaly coats to the last. You may almost see the flower peeping like gleams of coloured light through bursting buds, still they do not come forth. The willows, the hazels, and alders are tasselled with catkins most of the winter. But these are well-formed to resist the weather, and the fruiting blossoms of the nut are placed low down upon the boughs, well sheltered from the driving winds. March is a month of trial, but it is also one of promise. It comes to wake up all plants from their wintry sleep. Some of them sleep soundly and need a deal of waking, like children who can hardly be roused from their slumbers by gentle means. They must be vigorously shaken, and occasionally lifted out of bed before they will open their eyes, and become wide awake. Probably it may be so with plants. No mild February nor capricious April weather could arouse them so effectually as stern-voiced, rough-handed, surly-toned March. Fierce breezes summon the roots to action, as well as the tops. Possibly the mere mechanical force of its strong winds tends to start the sap in its nourishing career. Even the violent changes of March weather may have much to do with the awakening of plants to a new life. Heat and cold are powerful forces in nature, the one gravitating ever towards motion, the other rest. And when they suddenly come in quick succession, the sap of plants moves with every glistening sunbeam, and hides, as if ashamed of its temerity, when the frost grasps it again with its iron pincers; but again comes warmer and more genial suns than usual; the rubicon is past, winter coyness thrown aside, and leaf and flower have come out for the season. Now is the time of danger. Like the breath of passion fouling earth's fairest ones, are the black clouds iced for destruction around the north pole, and loaded with hail shot near to the Arctic regions, warranted cold and heavy enough to destroy and maim, or wholly kill whole hosts of plants at either long or short ranges. A great portion of our work for the month consists in watching and fighting the weather. We must keep careful sentry over it, and provide our tender favourites with defence in every time of need. The great danger is the being deceived by appearances. Better trust the most arrant rogue than confide in the constancy of March weather. The weather-cock is quite as trustworthy. Fore warned, fore-armed, is a grand proverb. The requisite protective measures will be indicated as I proceed. But I am anxious that the villa gardener should begin March in a state of expectancy, that the most dangerous and disagreeable things will most probably turn up. As an old salt would put it, look out for squalls, and, depend upon it, plenty of dirty weather will be down upon us before the month is over. Still it is a bracing busy month, and let us proceed to do its work with a brave heart and a hopeful spirit. With care and skill March may bring beauty and promise, and not blight our hopes and blast our prospects with the black trail of the frost.

THE KITCHEN GARDEN.

March is a busy month in this department. If the ground has all been properly roughed up, as so frequently advised in these pages, its necessary labours will, however, be much lightened. No digging should have been left for this month. With the ground all crumbling down into fineness beneath the harsh sweep of March winds, a heavy rake, light roller, a draw hoe or hand drill, it is astonishing how fast the main crops can be got in. Here, for instance, is a piece of ground to be cropped with onions. I will describe its preparation, as typical of all other grounds devoted to crops raised from small seeds. It lies rough, yet mellow, that is, the surface is uneven. The crowns and sides of these inverted, spadefuls thrown up at the winter digging are covered with a layer, several inches thick, of fine mould. Run a heavy iron rake over it, and a smooth surface is at once formed. A few stones will also turn up to be raked off. The back ought to be well bent in this operation, to bring the eye into a proper angle with the surface, and enable the operaton to rake it level, or rather even. Having formed an even surface, the next step is to provide a firm seed bed. This is a simple matter if the ground is in proper condition. The earth ought to be so mellow and dry that it will not stick to the feet. On a small scale the feet is all the roller that is needed. Having smoothed the surface, proceed to tread it down. For this purpose the footprints should touch each other. But a small roller does the work better. Run it rapidly over the ground once or twice according to its lightness and dryness. The object is to provide a moderately firm seed-bed, and equally firm all over it. The ground for most seed crops can hardly be too deeply stirred underneath, nor made too firm just on the surface. Small seeds on loose beds seem unable to get a proper hold of the earth. A certain amount of firmness enables the seeds to bite the ground, and while the stem is pushing through the thin layer of compressed earth, the roots push down in the opposite direction, and both top and bottom get a fair start on the right lines of growth. On a loose seed bed it is very often different. The seeds in germinating heave themselves out of the ground, and often perish or become a prey to birds and other vermin. This consolidation is equally useful, whether the onions or such crops are to be sown on beds or in drills. Villa gardeners often prefer the former. Beds from 3 to 3½ feet wide are sown broadcast, and small spaces or alleys left between from 1 foot to 18 inches wide. The ground either for beds or drills should be prepared exactly in the same way. Only for beds, the surface after compression should be scratched with a fine rake, about ¼ of an inch deep, to scarify the immediate surface, and prevent the seeds being washed off bodily by a heavy rain. Then sow the seeds, and scatter about 1-8th of an inch of earth over it, and smooth all down afresh with the back of the spade.

In drill cultivation, the surface raking, after compression, is dispensed with. Set out the spaces from 6 to 9 inches apart for onions; stretch a line along the outside, draw one drill quite straight. Then take a wooden rake, with four or six teeth, a little larger than those of a common hay rake. With one tooth kept straight in the drill already formed, proceed to bear down upon the handle till all the teeth are forced in about a ¼ or ½ an inch. Proceed steadily along, and four or six drills will be drawn each time. It is only needful to keep the last tooth in the last drill, and all the others must, of course, be straight with it. This is a much more expeditious plan than setting the line afresh for each row, and drawing the tiny drills with a draw-hoe. M. Le Butt, of Bury St Edmunds, offers a fine hand-drill, which not only makes its own tracks, but deposits the seeds at any desired thickness as well. This is a very handy seed sower, and a most economical seed saver in gardens. The villa gardener has only to empty his seed into a hopper, adjust according to size, determine the distance apart, and proceed to walk backwards and forwards up and down until the ground has been all traversed, or his seed is exhausted. He may then rest assured that the seed has been evenly distributed, and may expect to see that most satisfactory of all sights to the kitchen gardener, a regular braird all springing up at one time. The latter is of great importance, and is one great advantage of hand-drills. The depth being kept uniform, the seeds spring up together.

Onions.—Sow James Keeping, the Deptford, Nuneham Park, common white Spanish, or any other favourite variety, in drills 6 or 9 inches apart, and ¼ or ½ an inch deep.

Carrots.—A few rows or a small bed of Early Horn carrots should be sown. The seeds are difficult to manage to the uninitiated, as they all cluster together like bees. The easiest method is to mix an ounce of carrot seed in a 4 or 6 inch pot full of dry, fine earth or sand, incorporating them thoroughly by gentle rubbing and mixing. Then sow the earth and seed together. Defer the general crop till next month.

Parsnips.—Sow the main crop in drills from 15 to 24 inches apart, according as large or small roots are wanted. The Guernsey and the Hollow-crowned are the best varieties.

Potatoes.—The main crops should be got in during the month, unless the earth is cold, stiff, and wet, which no garden, however, ought to be. The modes of planting potatoes are legion. Some manure and dig all the ground, and dibble in the sets, in rows ranging from 15 to 30 inches apart, and the sets from 6 to 15 inches asunder. These may be accepted as the extremes of distance apart, either for the sets or rows. The average distance would run about 9 inches from set to set, by 18 between the rows, and from 6 to 9 inches deep. Some dig the sets in, starting with two sticks, 18 inches or 2 feet long, one for each end of the line. The first row is put in say 1 foot from the edge, then say 2 feet is measured off, and the line set at that distance. The space is then dug over up to the line, where a clear, open trench is formed for the

row. The manure is spread in the bottom of nch, the potatoes placed upon it, another 2 feet neasured off, and the digging and covering pro- s before. This mode used to be all but universal age gardens in Scotland, and the noble tuber l to thrive well under it. Some growers used nkle a little soil as a sort of buffer between the set and the strong dung. But in field culture is never done. The drills are drawn out deep ide, from 2 feet to 30 inches asunder. The dung in the bottom, the sets planted on the dung, e ridges split with a double plough, so as to two half rows at each bout. Thus the Scotch nd regents, that command such good prices in ndon markets, have a rich bed to start with on) of the dung. On light mellow soils, that have ug in the autumn, deep ridges are often drawn ith a large draw hoe, and the sets inserted. , on cold land it is a good plan to set the pota- ı the surface of the ground, and draw the soil ıem on each side with a hoe, or heap it up to a of 6 inches with a spade. This keeps the crop above the surface, and is a good plan on cold s. Another mode, which has many advantages, planting of the potatoes in beds, two or three ogether, and then leaving a 2 or 3 feet space n the beds. The potatoes are planted on the , and the earth from the vacant spaces or alleys ı over the sets. Then the alleys are manured, eply, and cropped with early cauliflowers or lettuces, spinach, French beans, or any crop ll come off in time for celery. If early potatoes wn, they will be harvested in time to set the the potato bed free for blanching the celery. ıe earliest crops, plant on the south side of dges, about half way down. The Royal Ash- Kidney, Mona's Pride, Early Daintree, Dalma- ıd Early Oxford, are good early varieties. For ıeral crop, it is difficult to excel Flukes, Lap- Milky White, Patterson's Victoria, and York s. I say nothing either for or against the sorts, only that I have not proved them.

.—Make one or two more sowings during the such varieties as Dillestone's Prolific, Laxton's ıe, Advancer, Champion of England, Ne Jltra, and British Queen. Stake the early

ıs.—Plant the chief crop of Long Pods and Windsor Broad Beans.

ages.—The winter has made sad havoc with ıis season. Sow some seed at once of some rapid-growing sorts, such as Melville's Fear- , Little Pixie, or any favourite early variety. ıver the autumn planted, make up blanks by sing plants from nurserymen or market gar- hoe and stir among the soil, and consolidate th by pressure with the hand around cabbage and do everything possible to assist them to On mild days sprinkle the ground around ong them with quicklime, so that no lurking slug may complete the work of destruction that the frost may have begun. The old cabbage stalks that generally yield so many gatherings of sweet sprouts in the spring are all killed outright at this season, and ought to be got out of the garden as speedily as possible, as well as all dead Brussels sprouts, brocoli, savoys, &c., as nothing can be more offensive in gardens, large or small, but especially in small, than the smell of decomposing vegetables.

Cauliflower under hand-lights, protectors, &c., examine.—Surface stir, make up blanks, and sow some seed at once for succession.

Brussels Sprouts.—Sow towards the end of this month in a warm, sheltered place. Also part of the stock of the large Green Savoy, and about half the seeds of Scotch Kale, or curly greens.

Leeks.—Sow in the beginning of the month in a seed bed, for transplanting on to rich ground.

Lettuce.—Encourage those to grow under hand-lights and protectors, and make fresh sowings on warm borders once a fortnight or three weeks, till the end of July, if a constant succession is required. A mere pinch of seeds is enough for each sowing. Such cabbage lettuces as All-the-year-round, Grand Admiral, Ne Plus Ultra, and Victoria, and such Cos as the white-seeded Bath, Nonpareil, Moorpark, and Paris White, are all that can be desired.

Parsley.—Sow in a bed or in a row, as an edging, on a bit of rich, deep soil, the finest curled parsley that can be obtained. Nothing in the garden is more useful than Parsley, and few things can equal the beauty of a garnish of the superbly-curled varieties to cold meat.

Spinach.—Sow a row or two in drills 1 foot apart of round or summer spinach.

Turnips.—Sow a few Early Red Dutch. I have found this by far the best early turnip. It is sweet and crisp, and a fast grower. It is too early for turnips in any quantity, but those who are fond of them should try a few.

Radishes.—These are in general request in villa gardens. A sowing should be made every week or ten days from this time. Wood's Early Frame, Beck's Superb Short Top, and the Red and White Turnip are good sorts.

Asparagus may now be sown in drills, 15 inches apart, on rich earth to form beds. It is better, however, to plant two-year-old plants in April, as a year or two may thus be gained.

Dress, clean, and plant sweet and savoury *Herbs*, such as Thyme, Sage, Mint, Marjoram, Winter Savory, Pennyroyal, Fennel, &c. Scarcely any of the produce of a garden is so useful as herbs. They take little space, are easy to grow, and the relish they give to otherwise the most commonplace dishes is marvellous.

Fresh plantations of *Rhubarb*, *Seakale*, *Horse-radish*, &c., may still be made. These vegetables ought to be found in every villa garden. Celery must be sown forthwith. Any good red and white variety are about

as good as another, and better, I had almost added, with the Irishman. The immense multiplication of varieties is a bore to us steady going practitioners. For years I was well pleased with Seymour's Superb White and Red, and now I have driven on to Cole's Superb White and Red. It is satisfactory to add that the latter is equal to the former. These should be sown under glass or in a cucumber frame, and brought on carefully to be ready for planting out in May. Sow again on a main border at the end of the month. Also mustard and cress every week for small salads to bread and butter, &c.

Protect seeds from vermin, also tender shoots of peas, beans, luttuces, and even cabbages. When greens are scarce, fowls, pigeons, sparrows, rats, mice, and all vermins' teeth, or bills, seem set on edge. And they are never more so than in March. It is therefore needful to stand sentry over the kitchen garden produce during the month, and to foster its growth by any means in our power. All dirty or dead matter must be instantly removed, walks turned, fresh gravelled, or re-edged, raked, rolled, and everything be made as fresh and spring-like as possible.

THE FRUIT GARDEN.

This is the month to try the mettle of newly-planted or root-pruned trees, and to test the strength of stakes of all kinds. The winds may have been stronger during winter, but there is something in the suddenness of March squalls that seems to test our supports to the very utmost. All stakes and ties should be examined before the burly winds of March get fairly abroad. A wring at the roots now would endanger the health, probably imperil the life of bush or tree. To be forewarned is to be forearmed, and it is as important to be prepared for March in our gardens as for the mariners at sea to prepare for the storm before it catches them in its rude embrace. And we must not only prepare for March winds, but for the fickleness of its weather. Sun and storm is the short epitome of its character. All the seasons of the year within a short hour is no unusual experience on a March day. Our so-called half-hardy trees and shrubs can make nothing of it. At one time, a glimpse of June-like sunshine summons them forth to bask their flowers and tender leaves in its warmth. The next moment hard December opens its ice battery of hail stones full upon them. Is it any wonder that they quiver, fade away, and die under such showers of grape shot? Our chief business throughout the month is to shelter our trees alike from the glare of the sun and the scathing bite of the frost-freighted air. For this double purpose, loose flimsy or thin permanent protection is the best. Of course I am not now considering glass. That I should call a house at once. Glass covered walls are but glass-houses under another name. But of these I am not writing, but of trees in the open, and what we can do to ensure their safety during March. Thin bunting is the neatest and cleanest of all protecting expedients, to be left down on sunny days and on frosty nights. It would be best drawn aside or rolled up when the weather is mild both night and day. With a current of air sweeping freely out at each end during sunshine, the screen would keep down the temperature, and retard the opening of the blossoms. The bunting would exclude any ordinary frosts, and also break, to a great extent, the force of the wind. Next to this, perhaps, a few spruce boughs overhanging the face of the walls, forms the most efficient protection to the blossoms. These have advantages over bunting itself. They defoliate themselves gradually, a needle or leaf at a time. And thus trees become inured, by degrees, to dispense with their extra covering with safety. Fern fronds, &c., are also useful for the same purposes. Another plan, very untidy, but efficient, I had almost written, in consequence of its untidiness, is to place some poles up against the walls, the tops under the coping, and the bottoms projecting 2 or 3 feet from the base of the wall, the poles may be placed a yard or 4 or 5 feet apart. Then a series of rough straw bands, with as many loose ends as possible, are tied to the front of these poles, at distances apart of from 1 to 2 feet, according to the diameter of the bands and their distance apart. The theory is, that no frost lines shall penetrate between the straw protectors. This forms most efficient shelter against frost, and breaks the force of cutting winds to a very great extent. It is untidy, and delights the hearts of the sparrows and other small birds. But such straw-beds have saved many a crop.

Frost falls in straight lines, to express a scientific truth in popular form, for of course frost does not fall at all, and is a mere nonentity, and by running wide coping-boards along, say 15 or 18 inches wide under the wall coping, the frost is pitched headlong over the top of the wall, and falls clear beyond its face, where the shivering trees are closely hugging the bricks. Or in other, and more strictly true words, the projecting coping intercepts the radiation of heat from the earth, the trees and the bricks, and returns a good portion of it from whence it came. And hence the lower escape destruction, and a crop of fruit is ensured. There are those who say that all such methods of protection are vain. I cannot believe it. And any or all such expedients are at least worth trying during this trying month of March. It does seem a pity that the labour of eleven months should be lost through the capricious weather of one, without at least making some effort to prevent it. Proceed with the pruning and nailing of all wall trees leaving peaches and nectarines to the last. Late pruning means late flowering, and is one of our most potent means of protecting the blossoms of wall trees. Be careful in pruning and nailing, or tying, not to knock off the fat, full buds. Dust the blossoms of plums, cherries, peaches, apricots, and nectarines, with a shower of dry soot on a dewy morning, to baulk the birds of their embryonic dessert. They don't at all relish soot sauce to their sweets.

Gooseberries, *currants*, and *raspberries* should be staked and tied, fresh strawberry plantations made, if not done in the autumn, blanks made up if the severe winter has made any, and another top-dressing of dung added if it can be spared. The strawberry is a great glutton, and can hardly be overfed. But then see what a return of lusciousness it makes by-and-by.

Graftings—This ought to be set about at once. Begin with the most forward trees, such as cherries and plums, should it be determined to graft such. Some prefer budding all stone fruits, but they will graft equally well. Then go on to the early pears, and finish off with apples. The scions should be several weeks behind the stocks, in fact it is important that the grafting should be completed before the buds of the scion begin to swell. The success of grafting depends very much upon handy and expert manipulation. Villa gardeners should practise for weeks on detached branches before operating upon their own trees. It is a delightful art to those who can do it well, and the pleasure of many a garden is much heightened by the fact that most of the trees have been grafted by its master or mistress. Cut clean, and let the two parts be placed together instantly, tied firm without bruising the barks, and the air excluded with clay or some of the many grafting compositions.

But I must leave the grafting to tell you to shake your *Filberts* daily while the male flowers are in blossom, to scatter the pollen dust over the tiny fruit blossoms. This will ensure nuts to crack by-and-by.

Fruit Stores.—These are sinking fast. Still examine and carefully remove any specked fruit. Those left are too valuable now to run the risk of having them rotted by want of attention. The French crab will keep good for two years with care, and it is as good, or better the second year than the first.

THE FLOWER GARDEN.

Remove every trace of winter decay and death as soon as possible, if not already done. Prepare clean beds and borders for the exhibition of spring freshness and beauty. It is not only bad taste, but downright cruelty to plants to force them to struggle into blossom through masses of dead or dying leaves and stems. Even if they can come through such tangled hindrances, the incongruity of their accompaniments spoils full half their charms. No bed nor border can be too scrupulously neat and clean, to welcome and set off spring beauties. The violets smell sweeter, the crocuses looks more gloriously brilliant, the forget-me-nots a deeper blue, the tulips and anemones more dazzling bright, on clean beds or borders. Let every thing, therefore, be neatly prepared for the display of spring flowers. A glorious gallexy of arabis, aubrietias, alyssums, daisies, primulas, hepaticas, in addition to bulbs innumerable, will be peeping forth to meet the early spring tide, and we ought not to do less than bid them a genial welcome to clean quarters. In fact, superb keeping, everything on bed, gravel, and grass without spot, is one of the chief charms of the flower garden at all seasons. Beauty and dirt is an antithesis so extreme as to cause pain. But winter and spring keeping are even more important than summer. In summer nature takes the earth largely into its own hands. Its drapery is so full and flowing that dirt and deformity are much hidden beneath her ample folds. But in the blackness of winter and the baldness of spring it is different ; and hence the superlative importance of art doing its best now to keep natural beauty company. Let us strive by the perfection of our keeping to rival the spotless purity of these first children of the spring.

The cleaning, digging, hoeing, or raking of *herbaceous borders* and *beds* should be completed at once. Every plant or group of bulbs in the mixed border should be carefully named, or its place indicated by stick or label. Gross growing plants of phloxes, Christmas daisies, pœnies, &c., must be reduced by division into smaller patches, and choice varieties multiplied by division. These operations should be attended to annually, else there is great danger of the plants of least worth and beauty monopolizing the greater portion of the space. Rich soil or manure should be put in where dahlias or hollyhocks are to be grown. The earth can hardly be too rich and deep for these plants.

If there are any unplanted beds in the flower garden intended for the growth of summer flowers, they may still be manured and dug ; or if this was done before winter, it is good practice now to turn the caked surface over with a fork on frosty mornings. The grass edges may also be fresh cut, the turf mended or relaid where faulty, walks re-made, turned, hoed, raked fresh gravelled, swept, and rolled. The grass lawn' should likewise be swept, watered with lime water, if infested with worms, and rolled smooth at least every week. All alterations to turf beds or gravel should be completed at once, as dry summers are apt to mar the beauty of March-laid turfs.

The *Pruning* and *Training* of all climbers should be completed as soon as possible.

Roses.—The perpetuals may be pruned towards the end of the month. The chief rule is to cut the weakest growers most severely. The strong shoots can carry a good crop of roses with impunity. It is a good plan to smear the fresh cuts over with grafting mixture. Look out for a beetle that often eats up all the best buds at this time of year. It can hardly be found by day, as it feeds at night. Come softly on a moonlight night, and you may make a good raid upon them. But the beetles are sharp of eye and ear, and sensitive to touch. There must be no hurried footsteps, no shaking of leaf or branch, no words spoken, else down they go to the ground as if shot dead, and being of a brown earthy colour, there is little chance of finding them there.

See that all the stakes and ties are fresh and firm, point over the surface, and, if possible, top-dress or

mulch with rotten manure, just covering it with earth to save appearances. If you want good roses, let no flowers grow over their roots—no, not one ; not even a violet nor a mignonette, the latter, though so sweet and innocent-looking, will rob your roses as greedily as a crop of cabbages.

Tulips, *Anemones*, *&c.*, in beds, protect from severe frosts. Crocuses, protect from birds. There is no better mode of doing so than to run along a line of small white string over the crocuses, about 9 inches above them. The birds sweep down for a meal, but as they alight they invariably take a peep at the sky line to make sure their upward course is clear. Oh, ho ! What's that they chirp out? Danger, beware, a trap, suggests the guards, caution, and off they go! Some use coloured threads, but they are not so effective. The smaller and more inconspicuous the thread the better. Were it a thick rope, the birds would sit and sing over the crocuses they had fed upon. The success of the plan seems to depend upon the semi-invisibility of the thread. The birds don't seem to see this until they alight, and as soon as they do see it they are off. This receipt is worth a fortune to villa gardeners. I have never known it to fail.

Hyacinths and *Narcissuses* should be staked to prevent the wind breaking them down. *Ranunculuses* may yet be planted, and the beds or patches protected from heavy rains.

Gladioluses should now be planted in light rich soil, and in a partially shaded position. Place the top of the crowns about 4 inches below the surface. They look rich in lines, or in triangles of three of one colour.

Pinks, *Carnations*, *Picotees.*—Examine both in pots, beds, and borders. Fill up any blanks made by the frost, consolidate the earth round the collars of the plants, loosen the surface of the ground, and top-dress with rotten dung. Give abundance of air to those under glass.

Auriculas.—Those grown under glass should have the frames set on bricks to permit a free current of air among the pots. Top-dress and shade from bright sun.

Hardy Annuals, such as clarkias, collinsias, nemophilas, silenas, godetias, sow in warm sheltered beds, and plant out those sown in the autumn. If the weather continues frosty and wet, the sowing and transplanting of hardy annuals had, however, better be deferred till April.

PITS AND FRAMES.

Tender Annuals, such as lobelias, amaranthuses, perillas, cannas, maurandias, maize, solanums, nicotianas, ricinas, wigandias, and other sub-tropical plants should now be sown in a warm pit or hot frame, to get them forward and well-established for planting out by the end of May. The great business of rooting cuttings of verbenas, pelargoniums, argeratums, petunias, &c., must also be set about in earnest. A top and bottom heat of from 60 to 70 deg. is the most suitable temperature. Rapid rooting is the chief thing in the spring. Fort his reason, all cuttings inserted now should be in a growing state. They will root with more certainty and despatch in consequence. Spring cuttings may also be much shorter than autumn ones. Last month I wrote no shading will be needed. But this month verbenas and petunias, and such fragile things may need shading, as March suns are fierce and strong, and spring cuttings should never flag. Water with caution, and cover sufficiently at night to keep up the temperature. All sudden depressions mean a stoppage, and stoppages not only lose time, but risk the life of tender cuttings.

Prick off all seedlings as soon as fairly up into pots and boxes 1 inch or more asunder, according to size. Pot off cuttings singly as soon as rooted, treating the young plants like cuttings still, until new roots are made in the fresh soil, when they may gradually be inured to a lower temperature, until finally placed, only free from frost. Roots of dahlias, Salvia patens, and Marvel of Peru, should now be started in a warm part of the pit. As soon as the young shoots are 1 or 2 inches long, heel them off with a sharp knife, and insert them as cuttings, and repeat the process of cutting, taking every week until sufficient stock is provided, when the roots themselves may be cut up into many plants with a growing shoot attached to each fragment. *Calceolarias*, for the flower garden in cold pits, should have the light withdrawn every day when the thermometer is above 40 deg. The heads should now be picked out, or a larger portion removed to form cuttings. Ours have never been once covered this winter, but then they are 2 feet from the glass, and most of them now average 3 or 4 inches high. We stop them all, and they each throw up from 3 to 6 strong shoots.

Cinerarias and *Calceolarias.*—Water, cover, and give air with care. Remove Cinerarias to the glass-house as they come into flower. Shift calceolarias into their blooming pots.

Pelargoniums.—Keep these in a temperature of 50 to 55 deg. Tie into shape, thin out the weak shoots, and water copiously with weak manure water.

Great care must be exercised to keep all the plants scrupulously clear of insects. Aphides seem often to come on the wings of March winds. Fight them, annihilate them with tobacco smoke. It is instant death to aphides of all sizes, shapes, and colour.

THE GLASS HOUSE.

Advance the temperature in March to 45 and 50 deg. Give abundance of air on genial days, but beware of a sudden introduction of frosty air on a hot sunny day. Rather let the temperature run up to 70 deg. with the sun, than sweep a volume of harsh cold air through the glass-house, to the drying up of the life blood of all its occupants.

Camellias, *Heaths*, *Epacrises*, *Azaleas*, *Cytuses*,

as, &c., will now be in full flower, or setting it. Camellia flowers must not be wetted nor else they will be spotted or marred. Even wind blowing over them will often tarnish auty. Some hard-wooded plants, such as ring heaths, may need a larger pot. Use but pure fibry peat (such as Epps sends out in silver sand, or a little charcoal. Drain the pots l give a small shift, only into the next size pots, the soil as firmly as possible between the new he old ball. See that the ball of roots and earth ned through before potting, else the new pot ve a coffin to the plant.

Fancy, and *French Pelargoniums*, must be a the warmest and lightest part of the house, arefully staked and trained. Scarlet or varie- eraniums may require shifting, training, and . *Fuchsias* should be shifted, stopped, and shape, and the same may be observed of all the denizens of this house, with the ex- of azaleas and camellias, which are best nto larger pots, either directly they flower, or as the young growth is fairly formed. This and nth are the best season for potting most of the a the glass-house.

water will be required now as the sun ens, and on very bright days, with a free circu- air, the paths, stages, walks, &c., ought to kled to throw some moisture into the atmo-

This mode of sprinkling is a much safer way tening the atmosphere of flower houses than prinkling the surface of the plants themselves. *ms*, *Cockscombs*, *Thunbergias*, *Phlox Drum- Rhodanthes*, *Primulas*, &c., should now be her here or in pits or frames.

ers.—Tie in as they grow, keep clean, and be carefully and tastefully trained.

THE VINERY.

nce the temperature this month to 50 deg. or fire heat. Syringe the vines twice a-day at nd sprinkle all the floors, borders, &c., three times a-day in bright weather. Aim at mak- rtificial May morning, laden with dew. This ng forth the sleeping buds, slowly, surely, like giants. Observe there are two or three buds from almost every eye. Let all come. Some, rub all off but the strongest. It is safest all at first. They help to summon the root into

As soon as they have grown ½ inch or so, all but two. Then leave these two until the are revealed. Choose the best bunch, and the second shoot. This is a much more sure tain means of disbudding for a crop, than that blindly to work in the dark, pulling off all t one. It is not always the plumpest bud that ie largest bunch. And the first development of ce but little out of the plant. These early are the product of last year's strength, rather e result of this. Give air on every favourable opportunity, avoiding all sudden changes, and shunning draughts as the embodiment of all evil for tender vine shoots. Beware also of any excess of fire heat, and especially of heating the pipes to a high temperature in the morning. Nothing is more trying to young vine shoots than their being placed, as it were, between two fires—the sun, and the pipes and flues. This drains the succulent shoots dry of juice, and checks their growth.

In disbudding vines, the process of reducing the number of shoots and leaves can hardly be accomplished too slowly. A leaf and a shoot to day and a few more to-morrow, should be the safe principle adopted. The interrupted sap has then the opportunity of choosing new channels, and of finding its way into the shoots and leaves remaining. Whereas, if many are removed at once, a glut of sap and its injurious consequences, are almost sure to ensue. To be benificent, our interference with nature should be slight and frequent.

THE ORCHARD HOUSE.

Still keep the temperature as low as possible, while excluding frost. Give all the air that can be admitted on sunny days. Towards the end of the month the trees will come into blossom. From that moment, till all danger from frost has passed away, the crop is in special danger. It was for this reason I counselled delay and caution. Early blossoming in unheated orchard houses, means the risk of losing all. A late blooming is synonymous with a certain crop.

During frosty nights, a slight covering of bunting or tiffany should be thrown over the glass. Safety from frost may also be found in shutting up the house early, and thus making the afternoon's sun fight the night's frost. When frost is expected, the house and trees must likewise be kept perfectly dry. Dry air is one of the most powerful resistors of cold. The trees or surfaces may be sprinkled in the morning. Unless, however, the weather is very bright and warm, all direct sprinkling of the trees overhead had better be dispensed with while they are in flower. A considerable amount of dryness is needful for the dispersion of the pollen, and this dispersion is indispensible to the setting of the fruit.

The trees may be slightly shaken or tapped several times in the course of the day, to distribute the pollen, or early blossoms may be touched with a camel-hair pencil. Should, however, a few bees find their way into the house, these expedients will not be needed. The bees will set the flowers better.

If the roots require water, give it in the morning, and see that they have enough to moisten the whole mass of earth penetrated by them. Should the surface not be dry before night, it might be mulched over with a little dry litter, or earth, should frost threaten. Give all the air possible during mild weather, and check rather than foster progress, till fickle March gives place to almost equally fitful, but less stern, dangerous April.

Arboriculture.

YEW TREES FOR SMALL GARDENS.

A GOOD deal of discussion has recently been carried on in the various horticultural and arboricultural periodicals, relative to the pruning of coniferous plants. I do not intend to enter now into the merits of this question, notwithstanding the diversity of opinion expressed regarding it, for what I wish, more particularly at the present time, is to direct the attention of villa proprietors to the proper forming of "yew trees," which, it may be stated, rank amongst the coniferous section of forest timber. On looking round the country, one does not now find the same number of yew trees coming forward as was to be seen in bygone times. It was remarked to me lately, that parties, instead of being supplied by nurserymen with young yew trees, only get yew bushes, and as bushes they are allowed to grow on. It is evident that in olden times, after planting yew shrubs, the stems of many must have been regularly pruned, so as to induce their tops to rise; but if the stems are kept unpruned, the plants will always remain of a bush form, although 18 or 20 feet in height. The free growing nature of the side or lower branches stint the free progress of upward growth. If the points of all the branches were regularly pruned in, without meddling with the tops, it will be found that such specimens will take an upright habit, but at the same time remain bushy. Shrubby yews, even although they should be 15 or 18 feet in height, can readily be converted into a tree shape, merely by cutting the branches off the lower portion of the stem, say to the height of 5 or 6 feet. After this stem pruning has been accomplished, the tops will make much greater progress than when all the lower and side branches were left on, by the formation of one or more leaders, which will annually increase in height.

On many large policies, yews are planted very extensively for game cover, owing to the branches being low and spreading much on the surface of the ground. On such places, an occasional stem-pruned specimen would have a good effect, besides assisting to encourage the spread of the branches of those left. After the necessary stem-pruning has been performed, either in the small garden or the extensive ducal policy, it will be advisable to place on the surface of the ground, under stem-pruned shrubs, a layer of fresh soil, 3 or 4 inches in thickness. Owing to the previous closeness of the branches on the ground, the roots are sure to be near the surface, and therefore easily injured by frost, or the sun's rays. To prevent this injury, and to throw additional vigour into the tree, it is absolutely necessary that the surface-dressing recommended should be carefully attended to. This top-dressing is also applicable to ordinary shrubs, whether Portugal laurels, or hollies, which have been cut down to within 2, 3, or 4 feet of the ground, while the want of it will prevent the branchless stems pushing out so freely as they otherwise would do.

The remarks here given for the common yew hold good with the Irish yew, as well as with the variety known as the upright, common, or Nidpath yew. Both these varieties (which no garden ought to be without) can be made to assume somewhat of a tree habit, by commencing the stem-pruning operation at an early stage of the plant's growth. With these last-named shrubs, stem-pruning should not be carried higher than 8 or 10 inches. By such treatment it

e found that the tops will keep compact
:sist the action of snow, which proves
rimental to them in their natural con-
. It may be argued, that such shrubs
e last mentioned are better in their
ıl state; still, as variety is pleasing, there
harm in having the same plant in both
tions. The change produced on the
ıth yew by stem-pruning, causes it to
r a distinct variety, and, indeed the
y known in cultivation as Taxus pyra-
is, seems often nothing more than a
›runed plant of the Nidpath yew; and if not, the variety called Nidpath so trained, may be sold as Taxus pyramidalis, and few could tell the difference.

In order to satisfy the tastes of certain villa proprietors, nurserymen would do well to have in store a few of each of the varieties stem-pruned. In selecting plants of the common yew for tree-growth, they should, as far as possible, have single tops. If a good specimen should have more than one top, the extra ones can be removed without injury to the plant.—*James M'Nab, Botanic Garden, Edinburgh.*

The Stable.

HORSE-SHOEING IN THE METROPOLIS.

SINCE we had occasion to notice this subject in this magazine, considerable attention has been drawn towards it, and, we venture to hope, beneficial results will be gained, inducing, on the one hand, an extended dispensation of humanity to a noble and valuable animal, and securing, on the other, a greater immunity from evils which nothing but want of observation and sheer ignorance positively impose.

But ignorance! Our readers will probably exclaim, what a charge to bring against the celebrities of the craft! It may appear, at first sight, harsh and uncharitable, but we affirm we do not meditate upon being either; and in the testimony we are about to offer, assure all whom it may concern, that with due respect to their cumulated knowledge, points here and there are found not within their comprehension, or may have escaped their keenest observation—they are therefore ignorant of them.

The energetic and humane Secretary of the Royal Society for Prevention of Cruelty to Animals is actively engaged in bringing to the surface all that belongs to the "heel-and-toe," or "claw-shoe" question, and its applicability to the Metropolis, and in the testimony advanced in the December number of that excellent journal, *The Animal World*, our recent article was almost quoted at length. In that, and the succeeding number, the opinions of veterinarians are given, some to the point, others scarcely so, yet we have not failed to witness with a lively interest the important movement in favour of our favourite quadruped. We think the writers generally have felt a degree of modesty on the question, and thus have failed to be even sufficiently commanding. It calls for united and energetic action, and we congratulate the Society, its excellent Secretary, and the writers, in the career they have entered upon. Mr Hunting wisely urges the "toe-piece, or claw, consists of a piece of iron (not steel)—welded across the toe." Many have been the dangers occurring from neglect of this little matter. Steel may oppose wear, but it lessens foothold, and is therefore inimical to safe travelling. The writer goes minutely into the advantages of "heels and toes," and sensibly denies their tendency to produce the veritable consequences they have, from periods remote, been designed and utilized to avoid. Will one of our opponents on the question undertake a tour over the snow-clad hills of "bonnie Scotland," or across the Simplon, "and give us his experience on the mode of travel, with brightly-worn steel brads in the soles, and destitute of spike stick or alpenstock?" If so, he will have to speak of sore legs, scratches, and bruises, the most important being, probably, the great pain in the muscles, occasioned by inordinate action. If he is a sensible man, he will provide spikes in his shoes, and a trusty stick, armed with a stout point, which become the analogues of the heels and toes. We crave this for an animal continually under similar conditions, and usually having, in addition, a load behind him.

The tripod theory is a myth altogether, and in our experience, which has length and number of years to bear in its favour, the dangers from treads are no greater than with the common flat armament, if humane men, not brutes, have the horses under their care. We have found, also, that side-bones and ring-bones, want of frog-pressure—about which so much newly awakened fuss has been made—thrush, false quarter, corns, quiltors, and the collateral evils, are about

as common among farm horses, and others wearing flat shoes, as those using the tripod. "Great men make great mistakes," and Mr T. D. Broad, M.R.C.V.S., is no exception. He unwittingly falls into a stupendous blunder when going dead against the "calkins," which he denounces as members of the category of evils in shoeing. He argues that the ground surface of a flat shoe, as used for a London dray horse, has a superficial extent of "22 to 24 inches. If the same shoe has two calkins and a toe-piece, the ground surface is then reduced to about 3 inches." Well done, Mr Broad! Thanks for your acute discovery! This is the very secret of success and superiority of the claw shoe. Remember the spikes in your soles, Mr Broad, and the alpenstock, or put galoshes over your boots when walking down Ludgate Hill, and we opine that before you reach our office a slight sensation of mysotis will be experienced, which may call next day for the aid of friction, opodeldoc, and anodynes to the region of the *gastrocnemii*. The flat iron shoe on the "greasy filth" of London streets —other towns, by-the-bye, have their equally greasy productions—is like the flat sole of leather or india-rubber, &c., of the human boot. The interposition of semi-fluid material between these and the flat stones prevents the surface of friction from coming in contact with that of the stones, on which it might take hold. The effect is to lubricate each with an emollient, and destroy friction The surface that exists may be extensive, and, under the conditions, more effectual must be slipping; small points, therefore, are required to penetrate this "grease," and reach the surface of attrition—not interstices, as Mr Broad vaguely supposes. These facts explain why horses slip, as with flat shoes, when the toes and heels are worn down.

Mr Broad is in error when he says "calkins" will not do on Macadamized roads. The Cockney says, they answer only upon such surfaces, but we give no weight to the authority. He is also in error, again, when he says, iron rolled into bars, having grooves or depressions, will answer to prevent slipping if made into shoes. Others equally believe this, but what will he say to the fact that we saw but a few days ago the shoes of "Good-enough" and "Gray," both "patents" designed to prevent slipping, actually turned up at the heels, the doings of "Jack Frost" having been good enough for the purpose of denouncing the frail conditions, although backed by the red tape, seals, and letters of Southampton Buildings? The Scottish Society for the Prevention of Cruelty to Animals have just awarded their prizes for the best essays on Horse-shoeing. It may happen that by them Mr Broad, and we, likewise, will be directed to features hitherto unnoticed, and probably the "claw" will be effectually clenched. For the sake of the animal we love, we say earnestly, may it be so!

The Dairy and Poultry-Yard.

ENGLISH CHEESE FACTORIES.

HOW TO ESTABLISH AND MANAGE THEM.

By Mr J. COLEMAN.*

I HAVE been asked to lay before this Club the experience of the past season in the introduction of cheese-factories into England, and as I have taken an active part in the management of the Longford Factory, in Derbyshire (which factory is the first that has been erected in this country), I will do my best to explain this subject; but I must remind the Club that the past year has been an experimental one, and we could not expect to overcome all difficulties in one season, and that season, as all farmers are aware, a very peculiar one. I wish to remind my hearers that we have been engaged in conducting an experiment *in public*—a circumstance which has been decidedly against us; but I will, as far as I am able, lay before you the history of the movement, and leave you to draw your own conclusions upon the subject. I shall allude principally to what has been done at the Longford Factory, and endeavour to explain the *modus operandi* of cheese making. The introduction of the factory system into Derbyshire arose in the following manner:—In September 1869, the Committee of the Derbyshire Agricultural Society, at their dinner upon the day of their annual show, determined to strike out of their toast-list all, or nearly all, the usual complimentary toasts; and when some of us, who were members of the committee, submitted the list to J. G. Crompton, Esq., the chairman of the day, the first remark he made was, "What am I to talk about? You have taken all the usual toasts out." In answer to this, one of those present replied, "We want cheese factories established, cannot you mention it in your speech, and stir up both landlords and farmers, as the Americans will soon beat us out of our own markets if we do not make a move?" After some talk upon the subject, Mr Crompton agreed to do what he could, and to that after-dinner speech we owe the introduction of cheese factories into England.

ORIGINATION OF THE LONGFORD AND DERBY FACTORIES.

Now comes the commencement of work, and a meeting was called of the members of the Derbyshire Agricultural Society, and a very large attendance was the result, clearly shewing that there was a feeling amongst the farmers that something wanted doing, and from the attendance of gentleman and landowners the meeting augured well for the movement. At this meeting a committee was appointed, and a guarantee fund decided upon, which in a few weeks amounted to upwards of £4000, shewing that the landowners and gentlemen were alive to their part of the work. Rules were now drawn up, different districts canvassed to know where the requisite quantity of milk could be had for the working of a factory, and many minor points decided. The guarantee fund was established to ensure the farmer who sent his milk to the factory a fixed price for his produce, so that in the event of the cheese made in the factory being amiss or bad in quality, he might not suffer, and the price which he has been paid is 6½d. per gallon (of 10 lb.) for his milk

* Paper read before the Farmers' Club.

e has had the whey besides, after the
ı has been taken off for the purpose
ıking butter, and any surplus after pay-
ɔrking expenses is divided, *pro rata*, with
ɹmers who supply the milk. The next
that was settled was, that we must have
n and a country factory; the town one
ıe accommodation of the public, who
d to see the process, and the country
ɔr making a full and fair trial of what
be done. This being decided upon,
Derby being chosen as the situation
ıe town factory, and Longford for the
ry one, we had to set to work, as
ıd at Longford an entire new building
ect, and only about six weeks to do
; this, however, was accomplished,
s in a great measure to the exertions
ıe Hon. E. R. Coke, upon whose
the factory is situate. The Derby fac-
which is an old building, was at work
ril of last year. As soon as we decided
a factory, or factories, the question
of who was to manage them, and we
we had no Englishman of sufficient ex-
ıce for the task, and after consulting
Mr Hayes, of Cary & Co., London, it
ecided to have an American manager,
should overlook both factories, and
ɹas immediately telegraphed for. In
ıary of last year, Cornelius Schermer-
the American manager engaged for us,
over, and brought with him some of
ıplements they use in America in the
y; but not one of our oldest cheese
s could understand the use of them;
e were quite at sea as to how to go to
to fit up a factory, but luckily we found
nerhorn so well up in all the details of
ːtory system, and having such an inti-
knowledge, not only of the manufacture
ese, but also of the arrangement of the
ıg, that we soon had things into proper
and looked like work. We were also
indebted to the assistance rendered us
Giles, architect, of Derby, who was the
ːct of the Longford factory. Mr Giles
is services gratuitously, so that you see
s and landlords were not the only ones
ıelped the movement. The Derby
factory started some weeks before Longford, in consequence, as I have said, of its being located in an old building, and was therefore sooner fitted up. As soon as work commenced, we found that for one manager to conduct two factories 10 miles apart was impossible, and therefore the guarantors (or subscribers to the guarantee fund) were called together, and they decided to send for a second American manager rather than be beaten, and Schermerhorn's brother was sent for, and in due course arrived, he taking the management of the Derby factory, Cornelius Schermerhorn going to Longford. I may here mention that the Derby factory works up the milk of 300 cows, and the Longford of 500. The factories have been managed by a committee composed of subscribers to the guarantee fund, and some of the suppliers of milk, who have conducted all the business of the two factories, and made rules, effected sales of cheese, and managed everything concerned; and this plan has worked extremely well, and everything has gone on as smoothly as possible, and completely refutes the notion that some persons have, that farmers cannot combine for any purpose.

INTERNAL ARRANGEMENT OF THE LONGFORD FACTORY.

I will now proceed to describe the Longford factory. The factory is built of wood, and covered in with asphalte felt, and is placed close to a road, and also a stream, and the receiving-house is where the farmers deliver the milk, when it is poured by their men into the weighing-can, and after being weighed, and a ticket of the weight given to the man, it passes down the milk-pipe, into the milk vats, which stand upon a lower floor, and which are so constructed as to enable us to heat the milk by steam, and to cool it by water, as they have an inside lining of tin, and an outside case of wood; the space between the two being that which is used for the introduction of either steam or water, as may be required. In the hot summer months, as soon as the milk reaches the vat, cold spring water, at a temperature of 52 deg., is turned on, and the animal heat

which the milk contains is soon got rid of, and the temperature of it brought down from 94 or 95 deg. to 60 deg., or thereabouts, at which it remains all night. I must now describe the agitators, which are used for the purpose of keeping the surface of the milk in motion during the night, to prevent the cream from rising; this is a most important matter, and one which requires very nice attention. The agitators consist of pendants of wood, with floats attached to them, which floats rest upon the surface of the milk in the vats; these pendants are fixed on a horizontal shaft, and at the end of this shaft is an arm, which is moved by the water-wheel, which wheel is worked by the water after it has left the milk vats, and has done duty in the cooling process, and it is now made use of as a motive power for the agitator; a very small quantity suffices for this purpose, and we are perfectly satisfied with the result. I will here remark, that it is very necessary to have cold spring water; in fact, I may say, you cannot make good cheese in hot weather without it. The water is left running through the vats all night, and in the morning the milk fresh sent by the farmers is added, which brings the evening's milk up to the proper temperature for the reception of the rennet. When the milk is fully coagulated, and at the time the manager considers best, the curd is cut with the knives being passed gently through the mass. This is done three ways, so as to divide the curd into small cubes. It is then well stirred with rakes of wood made for the purpose, and steam from the boiler is turned on, and the temperature raised to about 100 deg. or more if thought necessary, and the mass is kept moving. When the curd has been sufficiently cooked (as we term it), the whey is drawn off by means of a syphon, and run into a reservoir, where it remains forty-eight hours; and the cream, which in that time rises to the surface, is skimmed off and made into butter. After the greater portion of the whey has been, as I have said, drawn off by means of a syphon, the vat is then tipped up, and the discharge port at the end opened, and the curd and what whey remaining in the vat passes down a spout into the dry vat which stands on a lower floor than the milk vats. Here the curd is turned by hand, salted, and measured into the moulds, and then put into the press. It remains in the press until all the vats in the factory are emptied; and then the cheese, as we must now call it, is taken out of the mould or hoop, and has its jacket or cloth put round it, which cloth is of a similar material to that which the Americans use, and is known to all of you. The cheese is then put into the press again, and remains there until the following morning, when it is taken out and passed to the curing room above, and remains there until ready for sale. Such is an outline of the mode of manufacture, and with a boiler for steam purposes and spring water for cooling, we can bid defiance to any weather, and make good cheese under any circumstances, that is, always supposing that we get sweet pure milk delivered at the factory.

CHEESE FACTORIES AND PRIVATE DAIRIES.

The delivery of the milk requires close attention, and if it can be cooled down a little in hot weather before leaving the farm-yard, so much the better. I would recommend that two sets of milk-cans be kept and cleaned at the factory, so that the farmer has nothing to do with the cleaning of the milk-tins, but that a clean set be ready for all suppliers of milk to take back twice a-day. This we have not yet come to, but I am convinced we shall some day; for if the farmers have got rid of their dairymaids, who have they that can clean their milk-cans properly? And mischief often arises from this cause. The distance milk will have to travel has been thought by some to be against the factory; but one gentleman, James Brough, Esq., who is both a guarantor and a milk contributor, has sent his milk nearly 5 miles, and as he is very particular and has it cooled before starting, it has reached the factory in almost the best condition of any—even in the hottest weather of last year. I will now endeavour to contrast the cost of this method of cheese making, with the present farm-dairy plan in vogue in this country. I will take a factory of

750 cows, which is the best number, as far as we at present can judge, to work up together. Now, suppose this number made up of 30 dairies of 25 cows each (which is above the average in Derbyshire, whatever it may be in other districts), one skilled dairymaid is employed in each dairy—so that 25 are so engaged, or the farmer's wife takes the place; and at any rate it is proper to value the labour of the wife quite as high as that of the hired servant, and therefore the calculation remains the same.

30 FARM DAIRIES OF 25 COWS EACH.	£ s. d.	FACTORY OF 750 COWS.	£ s. d.
30 Dairymaids—wages, £15 per annum	450 0 0	1 Manager	150 0 0
Board of ditto, £20 per annum	600 0 0	2 Men, 40 weeks, at £1 per week	80 0 0
		2 Lads, 40 weeks, at 12s. p. week	48 0 0
		Extra help	22 0 0
			£300 0 0
		Gain by Factory	750 0 0
	£1050 0 0		£1050 0 0

This calculation gives £1 per cow saved in labour only; now, I have asked many of our Derbyshire farmers what their cheese, with all hired labour, costs them to make, and their estimate varies from 7s. to 8s. per cwt., and if we reckon 4 cwt. per cow as a good average of cheese for one season, this puts the labour at 30s., whereas in the factory it is less than 10s. Besides the gain, or saving rather, of £1 per cow per annum, there is another very great source of profit, and this is the better quality and the greater uniformity of cheese made; and I am quite sure that we can command a much higher price than the average of farm dairies can make. I have as nearly as possible ascertained what our milk suppliers at Longford averaged in 1869, and I find it was 73s. per cwt. of 120 lb.; now, if we allow 3s. as the difference in value between 1869 and 1870, their average this year would be 76s. As far as the cheese has been sold this year, the price is 80s. (and having all the best of our cheese now on hand, we hope to make even more of what remains), this is 4s. above the average of the farm-house plan, and this for a first season, and such a difficult one too! These facts must prove to any one that our movement is a right one, and only wants to be known to be adopted. We hope to make on an average quite 5s. per cwt. more of the factory cheese than can be made in the farm-house (with the exception of isolated cases), and this adds another £1 per cow per annum, or £1500 a-year, clear gain, upon a factory of 750 cows. Some of you may doubt these calculations, but come and see what we are doing as soon as the season commences, and depend upon it you will soon be of our way of thinking. The actual labour at the Longford factory, without reckoning the American manager, has been only £76, 7s. 9d., and upwards of 60 tons of cheese has been made. Take the make of English cheese at about 100,000 tons, and save £10 per ton in manufacture and improved quality, there is just £1,000,000 to go in the farmers' and landowners' pockets. Some of you may say that I have not named the delivery of milk at the factory, but this you will find a very inconsiderable item when three or four farmers join together for the purpose. Mr Lownes, of Longford, with a dairy of 44 cows, joins with two of his neighbours, and the cost to him is 4s. per week, or £8 a season of forty weeks, the utmost duration of the cheese-making season.

ADVANTAGES OF THE FACTORY SYSTEM.

I will pass on to the establishment and management of factories which landlords, farmers, or others may think proper to start in districts besides our own. In establishing cheese factories in future, there are two modes which present themselves to our notice: one is the co-operative plan (which, to some degree, we have adopted in Derbyshire), and the other is the purchase of milk by an individual—who runs all the risk of loss or gain by the manufacture of the milk into cheese. The co-operative plan is the one which we must depend upon for the factory system in its infancy, for this reason —viz., that I find not one farmer in twenty knows the value of his milk, and therefore he will be unwilling to dispose of it at a price which any one could make it answer his purpose to give; and another reason is, that if

any one does so purchase milk, it requires a large capital besides what the farmer has employed in his business—and the use of this capital must be paid for, and would form a stiff item of expenses. By the co-operative plan, the farmer who supplied milk would receive his share of the money made by the sales of cheese; and I must say, no one engaged in agricultural pursuits makes so quick a return — for no sooner has the cow consumed the grass than it is in the milk-pail and at the factory, and in six weeks or two months from that time it is in the market as cheese. Therefore there is no necessity to introduce a middle man with capital, who would only want to share the farmer's profits; and, small as they are now-a-days, this is quite needless. My advice therefore, to those who think of starting factories, is to make them co-operative; and I don't see why farmers in other districts cannot pull together as well as in Derbyshire —at any rate, they may if they try, and I think I have shewn that the trial is worth making.

IMPORTANT POINTS OF DETAIL.

I will now notice some points which, when your factory is started, require attention; and the first is to mind that you have an efficient manager, or as good a one as you can get—for if you have 500 cows only in a factory, you are dealing with from 80 to 90 tons of cheese per annum (at the lowest estimate). This, at present prices, means above £7000 worth; so you see you have a large quantity of a very ticklish commodity, and you must be careful into whose hands you put the management. I am aware that we have very few Englishmen who are capable of running a factory; but as far as we can in the Derbyshire factories, we are willing to teach a young man or two who may wish to learn; and then they must act as tutors to others when factories are started in fresh neighbourhoods. Your manager having been secured, the next thing is to have the right sort of hands under him—young men who can move about quickly and turn work off while some would be looking at it. These must be under the orders of the manager, who will at all times have to be responsible to a committee of management (if there be one) for everything that goes on in the factory. I think some may fancy the disposal of a large quantity of whey a stumbling-block to the factory system: we thought it so at starting, and I cannot say we have satisfactorily settled it yet. Our milk suppliers have a certain quantity allotted to each of them, and their water-carts are branded with their contents in gallons, and they send once or twice a-week, as the case may be, for their share. This has worked pretty well, but has its disadvantages; and one is that at hay or harvest time, and other busy seasons, they sometimes neglect to fetch it away, and this causes loss. The only way is to have proper piggeries at or near the factory, and the consumption of the whey made part of the business of the concern. Each milk supplier can send straw for bedding in the proper proportion, and take back his share of the manure made. This would reduce haulage to a minimum, and make the most of the whey, which will more than pay the working expenses of the factory by the butter that is made from it, if the same be properly attended to; and it is to all such matters as these, as well as cheese making itself, that the factory manager will have to pay attention; for the many littles, that a farmer does not think much of, will amount to a considerable item when seen through the 500 or 750 multiplication table of the factory.

REASONS FOR THE ESTABLISHMENT OF FACTORIES.

Having now finished my remarks upon the subject as it stands upon the card, I will notice a few of the reasons why cheese factories should be established, and who are the persons that would derive benefit from them. I am hearing every day in Derbyshire of the great dearth there is of good dairymaids, and that it is impossible to have the cheese made as it should be, unless the farmer's wife herself attends to its manufacture; and I may say, that in many farm-houses the wife has but a hard life of it, and

er children come second to the cheese; s not as it should be, and I hope we ıave the ladies with us in the movement. se making is not fit work for women, t very often does them very much harm, the very bad accommodation the farm- : dairy very often affords; and in ica they would not put up with its ;ery; no more will English farmers' when factories are started, and I have oubt the next generation will wonder their grandmothers managed to make e as well as attend to their other duties, just as we wonder how our corn would : thrashed by the flail. You may depend it, that when once the farmer has got cheese making from his house, his wife ake good care that she does not have it again, and small blame to her either. since I have been in Derbyshire, I have finding fault with the mode of farming— n general a poor and an exhaustive one, have blamed our farmers for not putting re upon their pastures, but saving all for meadows; and I have been told over and again that if they manure their pastures *vill spoil their cheese.* Now, this may be ase or not, but at any rate if it is, we by the help of science in the factory, ver it. From what I see of our dairy in Derbyshire, I am of opinion that it ices less than it did fifty years ago, and ny places is even now going backwards; for we all know that if a dairy of cows forms the sole stock on the farm, and have little or no purchased food given to them, that they must soon take the heart out of the land they are kept on, and I have no doubt many practical men will bear me out in this opinion. Another thing a cheese factory will do is, that it will bring more capital on to our dairy farms; and this we want very much, as many of our men are but nominees of the wealthy cheese factor, who advances them money before the cheese is made, and of course fixes his own price when it is for sale. I could give no end of reasons for the adoption of cheese factories; in fact, there *is everything in their favour*, and *nothing* (but what will disappear in practice) *against them.* The principal opposition we in Derbyshire meet with is from the local factor, who sees his trade interfered with, and naturally sets his back up; but we shall manage to get over him, and I quite expect to see this class of men set up factories for themselves, and purchase milk instead of cheese of the farmer. If not, we shall simply do without them, and we shall then have no more instances of a Derby cheese factor leaving £50,000 by his will to open the Sydenham Crystal Palace on a Sunday. Call me an enthusiast on this factory business, or what you like, I have said what I think, and those who differ from me now may, when they have seen as much as I have, go further than I do.

The Apiarian.

LAST YEAR'S BEE-KEEPING IN CANADA.

MR J. H. THOMAS, Brookin, Ontario, contributes the following article to the weekly *Toronto Globe* regarding the bee season of last year :—

It will be remembered that 1869 was one of the poorest seasons we have known in Canada for many years, so much so, that during the winter over half the bees in the country perished for want of stores ; hence the spring of 1870 opened with the number of stocks greatly reduced, and many of them in nearly a starving condition. But as 1869 was one of the poorest, so, on the other hand, 1870 has been one of the best honey seasons for several years. The result is, that bee-keepers find their loss made up in numbers, and their stocks in fine condition, while nearly all have taken some surplus honey.

There was, however, in many sections, a drawback experienced in the spring. The dry weather causing the honey harvest to fail soon after the drones made their appearance, they were in many cases killed off by the workers, though this did not affect the gathering of honey, as drones do not gather honey ; yet it retarded swarming, as the rearing of queens will not commence to any considerable extent when such is the case, and swarming is delayed until another set of drones are sure to make their appearance, the queen always laying drone eggs again as soon as the honey harvest improves. In all sections where this was the case, more or less swarms came off too late to gather sufficient stores, except in cases where they were put into hives containing old or empty combs. Fortunately for such swarms, there were a large number of such hives this season, owing to the great loss of bees last winter. It is always to be regretted by every bee-keeper when anything occurs to retard swarming in this country, as there is so little fall pasturage. In the section of country where I reside, we have nothing growing from which bees can gather anything worth mentioning after the end of August. If they hold their own during September we are quite satisfied ; but in sections where buckwheat is grown it is different. The amount of honey gathered this season, I believe, is greater than for several years. The amount taken from single stocks far exceeds anything ever before recorded in Canada. This, however, is partly owing to the introduction of the honey extractor, as by using it more honey may be obtained from a stock than would be stored in boxes under the most favourable circumstances. In order to use them, however, bee-keepers must use frame hives, and become accustomed to handling their bees.

The demand for Italian bees is fully equal to any previous year, and the reputation they have gained for being better workers is generally well sustained. Many are Italianizing their entire stock, and will keep no others, while others are satisfied with simply crossing. And it certainly is a great improvement to the stock to cross them with Italians, for the hybrids are fully equal to the pure, as honey gatherers.

The demand for frame hives is gradually on the increase, and several new patterns—new in some features of their construction—have been introduced ; and one is led to believe that ere long the market will be flooded here, as in the United States, with a "thousand and one" hives, many of which are not worth the expense of making. As a whole, the interest taken in bee-culture has been as fully maintained as in any preceding year, and the prospects are fair, as the fall has been exceedingly mild, that the season of 1871 has opened under very favourable circumstances.

IMPORT AND EXPORT OF AGRICULTURAL COMMODITIES.

THE Trade and Navigation Returns for the month of January, were this year later than usual, owing to the introduction of various improvements, which in future months will insure earlier and more precise information. The publication will be, by the new arrangements, facilitated twenty days, taking place on the 7th instead of the 27th of each month as formerly. The Returns are in a more compact form than they were wont to be. In an explanatory note which accompanies the issue, we are told the quantities of articles imported are now taken from the "Importers' Entries," instead of from the "Landing Accounts," which are not completed until a much later date; the figures given for the imports in January 1871, will not, therefore, compare with those given for the months of January 1869 and 1870—the former shewing the complete importations of the month, and the latter only the returns of the Landing Accounts, so far as received within the month, by which method the last seven to ten days' importations of the month were excluded. So great a divergence will not occur in subsequent months. The computation of the value of imports has been discontinued, and the value of goods imported is now required to be stated by the importer. In consequence of this arrangement, the value of imports is ascertained one month earlier than under the old system, and is now published with the quantities.

Following our usual custom, we summarize information especially relating to agricultural matters.

On the month of January, we find, this year, a very great decrease in the quantity and value of imported cattle, owing, no doubt, to the very inclement winter, which effectually stopped the traffic in beasts from foreign countries. The number of oxen and bulls reaching us this January was only 4290, as against 9801 in the corresponding month of 1870, and the value was considerably less than one half—viz., £72,359, to compare with £179,378. Only about half the number of cows was received, at less than half the cost, the number being 756, as against 1559 in the former January, and the respective sums paid for them £11,175 and £24,555. In sheep the decrease was still greater, the number being only 10,670, to compare with 30,391, and the cost £20,800, as against £59,356. Calves fell off from 1243 to 454, the cost last month being £2036; in the same period of last year it was £6215. Swine tumbled down in numbers from 8246 to 1048, and the currency from £32,546 to £3097. Bacon, on the other hand, rose in value from £19,168 to £212,403, and salted beef from £2820 to £90,621; shewing that the risk attending transport of cattle from abroad is inducing owners to slaughter more than they were wont to do at home. Through this increase in the value of dead meat, the total cost of meat was raised, in round numbers, £88,000 in the month, the totals being respectively £324,038 and £412,491. There was a large increase in the supply of butter, the quantity received in January of this year being 79,381 cwt., as against 50,393 cwt. in the corresponding period of last year. Fortunately, prices were lower this year than last, or we should have had to pay about £470,000 for butter, instead of £376,292, which was the exact amount. There was a still more marked augmentation in the returns of foreign cheese, the quantity received in the first month of this year being 59,122 cwt., as against 19,593 cwt., and the sum paid for it £185,375 to compare with £63,592—little more than a-third. These figures would seem to indicate that the country has been in a pretty prosperous condition.

Turning to corn, we find that the quantity of wheat, and the money expended upon it, were slightly in excess of January of the previous year. For barley, oats, Indian corn,

peas, wheat-meal, and flour, we paid a great deal less; but for beans a little more. One fact in this table must strike ordinary readers as being strange—viz., that while we are sending seed-corn to France, our imports from that country, during the first month of the present year, were nearly four times as large as they were in the corresponding period of last year, as the following table will shew:—

QUANTITIES.

	Month ended 31st Jan. 1870.	Month ended 31st Jan. 1871.
Wheat.	Cwt.	Cwt.
Russia	1,222,423	1,169,978
Denmark	33,576	1,520
Germany	257,217	14,365
France	7,591	28,286
Austrian Territories	—	4,771
Turkey, Wallachia, and Moldavia	64,141	108,936
Egypt	42,350	—
United States	1,192,948	1,554,587
Chili	—	21,305
British North America	66,173	114,656
Other Countries	23,748	7,364
Total	2,910,167	3,025,768

VALUE.

Russia	£544,997	£646,007
Denmark	15,529	930
Germany	132,584	7,990
France	3,701	15,741
Austrian Territories	—	2,096
Turkey, Wallachia, and Moldavia	27,766	60,940
Egypt	17,999	—
United States	589,359	880,164
Chili	—	10,805
British North America	30,605	68,631
Other Countries	10,875	4,133
Total	£1,373,415	£1,697,437

QUANTITIES.

	Month ended Jan. 31. 1870.	Month ended Jan. 31. 1871.
	Cwt.	Cwt.
Barley	649,838	439,468
Oats	713,218	312,982
Peas	126,616	33,022
Beans	134,568	158,031
Indian corn	1,176,959	681,105

VALUE.

Barley	£250,807	£169,300
Oats	242,912	111,676
Peas	47,357	13,323
Beans	54,667	72,255
Indian corn	373,108	256,306

QUANTITIES.

	Month ended Jan. 31. 1870.	Month ended Jan. 31. 1871.
Wheat Male and Flour.	Cwt.	Cwt.
Germany	126,734	16,951
France	113,555	240
United States	217,095	341,698
British North America	43	1,432
Other Countries	45,093	29,377
Total	502,520	389,698

VALUE.

Germany	£80,265	£14,221
France	77,596	160
United States	135,685	268,486
British North America	27	1,312
Other Countries	28,568	22,575
Total	£322,141	£306,754

The value of salted pork imported, amounted to £85,751 in the first month of this year, as against £20,519 last; and for fresh pork we expended £12,606 to compare with £9069. For hams we disbursed £5632, £2500 more than in the corresponding month of 1870.

The excellent crop of potatoes last year is still having effect upon importations apparently, though the war on the Continent has, doubtless, influenced to some extent the receipts, which only cost £222 in January 1871, the expenditure being, in 1871, £5079, and in the year before £22,595. The value of game and poultry increased in the month from £11,064 to £15,744. There was a decrease in the receipt of eggs, and we should like to see the diminution continue month after month if it is attributable to greater attention to the rearing of poultry at home. We are glad to think that this branch of husbandry is receiving a little more care than in former years, but it is still sadly neglected, and we are afraid the difference noted in the numbers—viz., 51,087, as against 124,239 in the month of January 1870, is less due to increased culture here than to the difficulties of France.

Coming to manurial substances, we find that there has been a great increase in the imports of guano. In January last we imported no less than 31,507 tons, for which we paid £383,022. In the corresponding period of last year all that we received was 2154 tons, at a cost of £21,314. On the face of it, this would seem to indicate that Peruvian guano, notwithstanding the abuse it has been subjected to lately, is growing in favour of farmers, but a considerable portion of the increase is, no doubt, due to the arrival within the month of vessels that had been detained on the voyage. There was also an increase in the quantity of bones—viz., 5084 tons, as against 4336, at a cost of £32,292 to compare with £26,883.

About feeding-stuffs; we note a large increase in oil-seed cakes — 17,290 tons at a cost of £171,672, the quantity received in the like term of last year being 4618 tons, and the price paid, £41,473. Cotton-seed was also greatly more in demand, there being 11,542 tons imported in January, or more than three times as much as in the corresponding month of 1870. The cost was £104,606. Flax seed and linseed were likewise inquired after in larger quantities, the imports reaching 132,968 quarters, the value being £384,013. Rape was much sought after, the comparative quantities being 8870, and 50,156 quarters in the respective months. The cost last January was £146,760. Clover and grass seeds to the extent of 47,961 cwt. reached our shores, the price mounting up to £132,051, more than twice as much as was paid in the corresponding month of the former year. The cost of the tallow imported was £332,969, over three times as much as it cost in the January of 1870.

The supplies of wool were nearly doubled, as the annexed table, giving the precise quantities and from whence they came, shews. The total value was £874,295, as against £500,310 in January of last year:—

	1870.	1871.
	lb.	lb.
From Countries in Europe...	1,392,284	2,390,758
,, British Possessions in South Africa.....	1,977,521	1,058,211
,, British India.....	501,893	2,221,945
,, Australia	3,601,541	10,331,808
,, Other Countries	1,388,647	1,789,854
Total.....	8,861,886	17,792,576

The export-list of home-grown agricultural products is shorter than usual. Bacon and hams are dropped out of the catalogue, and nothing is said about pork. It would seem that we had used up all in home consumption. We exported butter to the extent of £22,679, which is slightly in excess of the amount obtained in the first month of last year. Of cheese, the quantity sent away only came to £4819—little more than half the sum it realized last. Horses, as might have been expected from the war-demand, were numerously sent off, 1184 going away during January, as against 47 in the like period of 1870. The value was £31,365, to compare with £2607. Our exports of wool were nearly 100,000 lb. less than in January of last year, the respective quantities and receipts being: — 1870, 407,493 lb. and £26,590; 1871, 313,961 lb. and £19,037.

The Country Gentlewoman.

THE DECORATION OF DRAWING-ROOMS AND DINNER TABLES WITH FLOWERS.

CHAPTER II.

THE decoration of apartments and dinner-tables with flowers, is each year becoming more popular. Greater zest is thrown into it by ladies, perhaps more on account of the prizes that have of late been so freely given for the most tastefully arranged groups of flowers at our horticultural fêtes. It makes one anxious to vie with those of others who take the same amount of interest in similar undertakings. Even our continental neighbours, the Parisians—who will doubtless be some time before they can again compete for the same prizes that they carried off with such due honour at the Crystal Palace Show last summer—tried to conquer some of our comparatively poor attempts at cut-flower arrangements, and, in some cases, succeeded in doing so. There was also a magnificent display at the Botanic Gardens, Regents' Park. These exhibitions, which require so much taste and skill, add greatly to the charm of our London and country flower shows, where any attempt at artistic decorations in this way is made.

In natural as well as in artificial productions of flowers, the most simple and unpretending arrangements are usually the most pleasing and effective. What can be found more sweet or refreshing in a bouquet than lilies-of-the-valley, mignonette, moss rose-buds, violets, the pretty blue or white myosotis, and many others equally simple and beautiful. There should be taste displayed in regard to the arrangement of colours. Some that shew off to the greatest advantage by day light, are insignificant by gas light. Scarlet, yellow, mauve, bright green, crimson, intermixed with white, wil be found the most effective colours to use for the decoration of dinner-tables in winter by gas light.

For dinner decorations, of course, no definite rules need be laid down, a well-cultivated eye being the best guide to secure tasteful contrast of colour. It is very usual now, to have in the place of an epergne, a large block of ice, which should be relieved from its massive appearance by placing in its uneven parts little tufts of club-mosses of sorts. Some placed in the plateau at the base of the transparent block is a great acquisition; it helps, at the same time, to absorb the water from the ice which is continually melting. This has a very charming appearance in hot weather, or in a crowded room, where one is so thankful even for a glance at anything cool or refreshing.

There is great variety in stands for dinner-table-decoration, both in metal and glass, but I believe the glass Marchian stands to be the greatest favourites. Although they are devoid of grandeur and novelty, they are inexpensive, can always be obtained, and when tastefully filled, look equal to the most elaborate designs, unless beauty and the artistic formation of the stand is to form the principal object of attraction. There have been lately introduced some flat, narrow crescent-shaped stands. These are chiefly used as corner and side ornaments, but they require a tall centre-piece to shew them off to advantage.

The base of the stands should be filled with silver sand, and Selaginella denticulata placed upon it forms a firm foundation for the flowers to rest upon, and will be found

extremely advantageous when flowers are very scarce.

sufficient foliage of various kinds to make t whole a most pleasing, artistic-looking c

Design for an Aviary and Aquarium.

The stands should be elegantly and lightly dressed, the flowers not at all crowded, and

ject. A stiff crowded affair impedes the vi across the table, and spoils the *tout ensembl*

In my next chapter I hope to have the pleasure of giving my readers an illustration of a Marchian stand effectively arranged, so that those who have not yet tried their hand at decoration will be better able to judge what I have hitherto endeavoured to explain.—*Annie M. Williams, Victoria Nursery, Upper Holloway.*

DESIGN FOR AN AVIARY AND AQUARIUM.

WE give on the previous page a design suitable for the centre of a conservatory. In the present case, the whole structure is in the rustic style, composed of rough wood from which the bark has been stripped. In conservatories which possess architectural features, it may be advisable that the base of the structure should be lined with lead (or zinc if economy be an object) to hold the soil—the sides being raised about two feet from the floor. Maw's or Minton's tiles should be used to decorate the sides—the top edge being formed by the overlapping lead or zinc. In the centre, below the aviary, may be placed the aquarium, or a small fountain, of a size and shape to be determined by the owner of the conservatory.

In our engraving the aviary is supported by gnarled branches, on which are placed rustic vases, in which plants are grown. Those most suitable for the purpose are Corypha australis, Chamærops humilis, Latania Borbonica, the Dracænas, Pandanus of sorts, and others of like habit.

The plants best adapted for the base of the structure are ferns and foliaged plants—not flowers, which are seen better when placed on stands or stages around the conservatory.

THE

)UNTRY GENTLEMAN'S MAGAZINE

APRIL 1871

A NEW THEORY ABOUT LAND.

'HERE is nothing in connexion with things human or divine, too large or sacred for the grasp of Mr Odger. The inies of nations he can hold in his hands; the fellowship which he and his coms have generously extended to France has, urse, not only gratified, but benefited much French Republic. From his throne on flag-stones in Trafalgar Square, the *fiat* Mr Odger carries joy to oppressed nalities, and tremour to hearts of nts. His countrymen look up to him reverence, and wonder, as much they , how one small head can carry all he ws.

'ell, Mr Odger has just been seeking sh fields and pastures new" for the lay of his marvellous attainments and ory. He has taken by storm the "canny s," in the metropolis of their country, wrested from the cautious ones, as the *man* tells us, a "cordial" vote of thanks he pleasure and profit they derived from peech.

'e should not have troubled ourselves h with Mr Odger, or his admirers, had not question upon which he dilated in Edinh been one of land, and the mode in h he would arrange for its disposal never it should chance to come into the ket. The present laws in connexion land, he regarded in as bad a plight as Irishman's notoriously imperfect gun, which, it will be remembered, wanted a new stock, lock, and barrel. No attempt, solemnly declared Mr Odger, to his sympathizing audience, "to patch up the existing laws regarding land would ever meet the wants and wishes of the people of this country." The laws must be totally reconstructed; and with that fine regard for the freedom of the subject which was to be expected from Mr Odger, he would have them reconstructed in such a fashion as "to prevent any private individual purchasing lands. The same Act should contain a clause *compelling* all who wished to sell land to communicate with Government Commissioners, with the view of selling the land to the Government, for the use of the country generally." This sentiment was greeted with "applause" from listeners who, we should fancy, would not care to part with their shop-wares under similar restrictive conditions. With a gracious magnanimity, which we cannot but admire, Mr Odger says, that his Bill (which he is never likely to pass or see passed) should not "propose that any one possessing land should be *compelled* to sell, but only that those wishing to sell should be *compelled* to sell to the Government." Apply this theory to the circumstances of those who hung with admiration upon Mr Odger's words, and applauded the principle they expressed. Supposing a shopkeeper in the High Street, who wishes to sell

his shoes; another in Waterloo Place, who is desirous of parting with coffee and soda-water; and a third, in Hanover Street, who wants to get his miscellaneous stock out of his shop, would they appreciate the Government entering in and ordering a compulsory sale? We hardly think so. There are no men who would better like to dispose of their goods to the best customers. And is not land as much a commodity as children's slippers or hob-nailed boots, as tea and lemonade, or as twopenny pocket-handkerchiefs and shirt-fronts? Why, therefore, should landlords be called upon to part with that which is more inalienably theirs than the perishable wares of the shopkeeper, except to the best bidder? But the landlords, says Mr Odger, would have no cause of complaint. Certainly not!

Men with—

"The caste of Vere de Vere"

have a repose of manner that remains undisturbed under injustice. It is only given to the Odger class the desire and power to resist and triumph over wrong. And is it not curious that the men who complain of the tendency towards centralization in Government, who denounce its mismanagement in all departments of the State, its extragavagence and waste, are yet so credulous as to believe, and so bold to declare, that in the management of one of the most difficult things in the world to manage—land—Government would so improve the soil, that "through the increased rents of the land, the taxations which are now calculated to absorb the best interests of the country would be materially lightened." We must apologize to our readers for occupying space with such nonsense. We do so, only because we know that at times nonsense breeds mischief, and an antidote is found in setting it forth, plain and unadorned.

INJUSTICE TO FARMERS.

THE Prime Minister has been addressed by a body of farmers, numerically small—only sixteen—but whose names carry some weight, upon the injustice of the laws relating to the tenant occupancy of land in Scotland. Among those who attached their signatures to the document addressed to Mr Gladstone are—Messrs George Hope, Fenton Barns, East Lothian; William Goodlet, Bolshan, Forfarshire; David Cunninghame, Chapelton, Ayrshire; Alexander Taylor, Cushnie, Fordoun; William Smith, West Drums; James Cochrane, Little Haddo, Aberdeenshire, &c. The signatories have a dozen heads of grievances. The first matter they complain of is the hardship involved in compelling a tenant, sued by his landlord to remove from his farm, to come prepared with a responsible surety, failing which the judge *shall not* listen to him unless he "instantly verifies a defence excluding the action." This, it is complained, is very harsh and unjust towards the tenant, as unless he is provided with a surety he is at once condemned unheard. "Were the tenants allowed," say the writers, "he might be able to bring irrefragable evidence of a verbal bargain for a year, which is good in law; but since oral evidence cannot be taken at that stage, he must be instantly prepared with surety, or lose his case. He may hold under a written lease for years unexpired, but such leases are rarely in the tenant's possession; and if he cannot immediately produce it to the judge, judgment is to go against him. He may hold under informal writings or memoranda, which, with possession, make, in law, a good lease; but without surety he cannot be allowed even to state his case, much less to prove by witnesses the facts on which his right depends. In these and every such case he is thrust out, unheard by the judge on the substance of his rights."

It is pointed out that such a law operates

ı the same, or even in a more injurious in the case of a labourer arbitrarily ɔd to remove from his cottage; he has cally no redress, as it is seldom that he ind surety to the extent of a double which is the amount that can be de- ed by the landlord. "The man may right and law on his side as clear as the f it could be inquired into. But under aw he is silenced, bewildered, ejected." true, indeed, as the correspondents of 'remier frankly admit, that such cruel ıres as the law allows, the courts, in the ɔf the labourer, are not often called upon ard. But landlords should not have it ir power to turn on the screw so piti- at the instigations of unscrupulousness indictiveness. The writers do not ask he litigious tenant should have facilities to prolong a defence merely in order to unwarrantable possession. "Let it be *discretion of the judge* to order surety he sees, or on reasonable grounds even cts, that such is the case. Let him, if be, enforce that order by giving the ɔrd *interim* possession when surety so ed shall not be found. But don't stop ial of the case. Let the man be heard Let his evidence be fairly taken. Give hat equal justice before the law which ured to every one else."

der their second count against the jus- f the laws with reference to the rela- ıip of landlord and tenant, it is pointed ıat the owner of the soil can, the tenant ; him one year's rent, claim in security ɔllowing crops; and that on the failure farmer to produce this security, which it rcely likely he can, seeing he is in arrear ent, a summary ejectment may take

Such cases of arbitrary proceedings the part of landlords are very excep- , but of course the writers naturally o make the most of the case against a hich, more honoured in the breach n the observance, certainly bears on the ɔf it to be monstrously unfair. They ly instance cases where the landlord, ; first tied up the tenant's hands by sequestrating the whole of his effects for rent, and so destroying his credit—sequestration instantly precluding the tenant, under pain of imprisonment, from selling his produce, stock, or effects, even for the purpose of paying the rent—has managed to effect his ejection in the middle of a lease by an action for security or removing.

Another grievance that Messrs Hope & Co. complain of is the compulsory removal of tenants who have effected improvements without any compensation being allowed for these permanent or unexhausted benefits, which the tenant, out of his own means, has conferred upon the land. With regard to permanent improvements, the writers do not desire Mr Gladstone to enact, as in Ireland, "that all improvements shall, until the contrary is proved, be deemed to have been made by the tenant." All that they claim is, "that the scales shall be adjusted *evenly* between landlord and tenant, and that where it is shewn, in point of actual fact, that a building or permanent improvement has been made by the tenant at his own cost without special contract with his landlord, that improvement shall be and remain the tenant's, to be taken away if he likes, unless he is compensated for it."

The evils of the law of hypothec are strongly commented upon by this Reforming Company. They contend, as its opponents have all along urged, that the undue security which the law gives to the landlord enables him to let his farms to men of straw, instead of men of capital, at higher rents than they are worth, well knowing that under the protecting ægis of hypothec he will get his money all right. The law, it is also asserted, "keeps the tenant, after he has entered on his farm, under a perpetual mortgage even before the rent is due. It touches his credit, hampers him in dealing with his stock and crop, and, if misfortune overtakes him, operates most unjustly against his ordinary creditors." Many farmers, of a smaller class, however, do not look upon hypothec in this light. Nay, in their ignorance, they believe that it is rather beneficial to them than otherwise, in

distressing times. But this, we suppose, we may attribute solely to a lack of knowledge of their true interests.

The Game-laws come in for anything but flattering comment; but, as we have recently heard and said so much about them, and shall shortly have so much more to hear and say, we shall pass by this head without further remark.

The law which prevents a farmer, suffering from illness, transferring his interest in his farm to any other than his landlord, and which prevents him from selecting his heir, Mr Gladstone's correspondents would like to see amended; also, they wish to have twelve months' notice to quit a farm instead of only forty days—a term utterly inadequate —and permission to a tenant who has counter claims against his landlord, should be allowed to set these up without being called upon to pay down the full rent; that penalties for non-fulfilment of lease, or mismanagement, should not be exigible unless sued for within twelve months, and that a fair and equitable construction, rather than a technical one, in event of dispute, should be taken of clauses in a lease where the tenant had not had the advantage of professional assistance when arranging with the factor. The document concludes as follows:— "This statement is laid by us before you in good faith, but with no pretension, on our part, to any representative character, or any claim to speak by authority. Our desire is to bring to your notice, as the head of the Government, a state of things which we regard as essentially wrong, and which we, with some confidence, trust you will acknowledge calls at least for examination. But if we should be disappointed in this expectation, we believe that the time is at hand when the gross injustice done to tenants by the present state of the law will become a capital question in Scotland, and when it can neither be so calmly considered nor so easily settled as it may be now."

There cannot be the shadow of a doubt that there is great hardship connected with the construction and working of laws regulating the business relationships with landlord and tenant, and remedies for the evils must ere long be found; but we think it is to be regretted that the signatories to the above statement, of which we have given the gist, should have thought fit to close it with a threat.

AGRICULTURE IN ABERDEEN AND BANFF SHIRES.

WE make the following extracts from the prize essay of Mr Milne, Mains of Laithers, in the new number of the *Transactions of the Highland and Agricultural Society*:—

SIZE OF FARMS.

As might be expected from the natural poverty of the soil, a large proportion of the holdings in both counties are small. Farms vary in size up to 600 acres, but very few exceed 400 acres. In a few instances, one individual holds two or more farms. In the lower and richer parts, the size of farms may average 200 acres, but in the higher and poorer districts, the average size is under 30 acres. The tendency is to increase the size of farms by adding the smaller to the larger. The number of returns obtained in 1868 from occupiers of land owning live stock was, in Aberdeenshire, 12,021; in Banffshire, 4086. The average extent of land returned by each occupier was, in Aberdeenshire, 47; and in Banffshire, 39 acres.

RENTAL.

The land rental has largely increased during the last thirty years. Since 1815, it has considerably more than doubled. The rental of arable land varies from 9s. to £2 per acre, the average is about 22s. As an example of the increased value of land, and improvements which have taken place within eighty years, I will give that of a single farm. The farm of Mill of Laithers, near Turriff, was entered in 1790 by the late Mr Murray, father of the present tenant. It then extended to 100 Scotch acres, of which about 30 were arable; the rental was £11 in money, 16 bolls meal, and 4 bolls bere. The farm of Scobbach, adjoining, the extent of which was rather more, was rented at £5 in money, 20 bolls of meal, and 1 wedder. These farms are long since all arable, and are rented at £375, or a rise of over 600 per cent. The value of farm buildings seems to have increased in an equal ratio. The farm-steading and dwelling-house on the farm of Mill of Laithers, which belonged to the tenant, were valued over to the incoming tenant in 1790, the whole farm-steading at £2, 9s., and the dwelling-house at £1, 5s. The prices of farm produce, excepting grain, were then very low; all classes were poor, and money was very scarce. The prices of farm produce are now very high, the only article which has remained without much rise in price is grain; wages are good, all classes are living in comparative comfort; cottages and farm buildings have greatly improved, and are still very rapidly improving.

FARM BUILDINGS.

Until of late years, in many cases farm-steadings were not in a satisfactory condition. Formerly (and even at present on a few farms) the buildings belonged to the tenants. When a lease expired, the incoming tenant paid their value to the outgoing one. This custom has fallen somewhat into disuse; on most estates the proprietors have purchased the houses from their tenantry. On some estates it is still the practice to bind the tenant to expend a sum upon additions or renewals of the houses, which then become the property of the proprietor; for which outlay the tenant is supposed to reimburse himself by giving less rent. On a large number of estates, the tenantry are still burdened with what is called "dead inventory," by which the tenant has to maintain the entering value of the farm buildings at the end of his lease. If they are then of more value, he receives nothing; if of less value, he has to pay the proprietor the difference. This custom is so one-sided that it ought to be discontinued. Farm buildings have improved greatly during the last twenty-five years. On the majority of farms they are good; on a few they are superior, 1

arranged, lofty, and commodious; while not a few retain the old clay and thatch tumble-down tenements.

LEASES.

Almost every farm is held under a lease, generally for nineteen years; in some cases for fifteen years only. Without leases, the agriculture of the counties could not maintain its present high position. A large proportion of the soil is light, shallow, and naturally poor, and without a continuous application of artificial manure would not produce remunerative crops. The security of tenure which a lease gives to the occupier, induces him to expend large sums on the improvement of his farm. Where much of the farm is waste, or where, although arable, it is unimproved and undrained, or poor and full of weeds, nineteen years is too short a period to enable a tenant to bring the farm into a proper state, and remunerate himself for the large outlay. In such cases, the lease should be of thirty or forty years' duration. To prevent the deterioration of the farm, a new lease should be given several years before the old one expires. Although a lease is the most satisfactory arrangement that has yet come into use for regulating the occupancy of land, not a few, as presently drawn out, prove a drag rather than a spur to agricultural progress. Many leases are made up chiefly of antiquated forms, obsolete cropping clauses—some of them copied and re-copied for 200 years—game clauses, and useless restrictions and reservations. While the lessor, who signs away the use of his land to another for a period of years, is perfectly justified in providing against the possible deterioration of his land by a designing tenant, and in insisting that it shall be cultivated on good and approved principles, yet the insertion of too stringent clauses in leases is found in practice to hamper a good tenant, and is almost powerless to prevent a bad one from running out the farm. The reporter protests against the insertion of conditions in leases degrading to the tenant. On a large estate with which the writer is acquainted, the tenants are prohibited from using a dog or a gun, and are strictly bound not to complain to the proprietor of any damage that may be done by game; while they may be ejected from their farms for the nonfulfilment of these or other equally absurd conditions. The reporter is sorry to state that clauses dictated in the same spirit are not altogether uncommon in leases on other estates. What encouragement do such leases hold out to high-farming? He would not be giving a true report of the feeling among farmers if he did not state that, as in other counties, there is a general discontent with several laws relating to agriculture, such as the Game-laws, the Law of Hypothec, and the laws relating to the removal of what are presently considered fixtures, the repeal of what are asked as acts of simple justice between man and man. With the great change which agriculture has undergone during the last twenty-five years, an equitable system of tenant-right would be to the advantage of landlord and tenant. An allowance for permanent improvements, and for extraneous manures applied in the last years of the lease, would be both just and politic.

SOCIAL POSITION OF FARMERS.

The inhabitants of the north-east of Scotland have long been proverbial for their sagacity, caution, and shrewdness. The farmers are by no means deficient in these qualities. Most of them have received a liberal education at the excellent parish schools, which are here superior to any other part of Scotland. Not a few have received a finished university education. Many of the larger farmers are highly intelligent, skilled in the practice of agriculture, and expert in the management of public business. The smaller farmers are industrious, frugal, and have a good knowledge of their business. Fifty years ago, the smaller farmers, and most farms were small at that time, were at certain seasons comparatively idle; the sowing and reaping of the grain crop was the chief occupation of the year. Modern agriculture has revolutionized this state of things: the extensive introduction of turnip husbandry, and the tending of cattle, afford a never-failing

oyment during a great part of the year. increased rents consequent on the great etition for land, the great rise on the of labour, and the large outlay required ie manures necessary for profitable farm- iave rendered untiring industry, skill in irection of labour, and the adoption of ovements in implements and in farming, cessity of the farmer's existence; while continual succession of operations at season of the year incident to modern andry, require on his part incessant nce; and with all his skill, the variable- of the climate will frequently upset all alculations. The social relations and course among farmers has of late years rgone a change. Changes in the occu- y of farms are more frequent than for- r, and the new tenants arrive from er distances. The introduction of rail- has induced more frequent travelling nore contact with strangers; this tends osen local ties, and break up the seclusion olated districts.

IMPROVEMENTS STILL REQUIRED.

otwithstanding the progress made by iern agriculture during the last twenty- ears, much yet remains undone. There till a number of farms very imperfectly and manured, and abounding in weeds; mber of fields without shelter of any which could be greatly improved by hav- ielter belts planted; a number of cattle be seen in these fields which might be oved by more careful selection; a num- ber of fields imperfectly drained, and a larger number without proper fences; a number with too many large stones, some of them above the surface; a number of acres of waste land, the reclamation of which would improve the produce and appearance of the country; a number of farms having only tracks where good roads should be, and with tumble-down farmeries; a number of home- steads deficient in accommodation for stock, and a number built as if for the purpose of wasting manure. Besides these, and other defects which are visible to every observer, there is room for other improvements. As has been already stated, the conditions in many leases are far from satisfactory, and prove detrimental to agricultural progress. Improved agricultural machines might be more extensively used. The scientific educa- tion of the farmer should be more attended to, so that he might know how to purchase and use artificial manures and feeding-stuffs. At present, he follows the practice of others, and is sometimes the victim of imposition. So great has been the progress of agriculture during the last seventy years, that it would be idle to speculate as to its future. What in- crease of produce may be grown from deeper and more thorough cultivation, from more thorough drainage and liquid manuring, from the discovery of new sources of manure, and from the improved selection and feeding of stock! And if he deserves well of his country who makes two blades of grass grow where one grew before, so does he who introduces even the smallest agricultural improvement.

PROPOSED ABOLITION OF THE HERRING BRAND.

THIS brand has often been in danger, and its continued existence is an illustration of the proverb, "that threatened men live long." On this occasion, however, says the *Banff Journal*, the danger is more than usually serious. Very curiously, the beginning of the movement against the brand, now to be noticed, comes from Holland, from which this country copied the system of official inspection and branding. Information on the matter is embodied in a return issued from the office of the Board of Trade last week, in accordance with an order on the 9th inst. by the House of Commons. The return gives first a report by the Dutch Sea Fisheries' Commission, and then supplies a correspondence between Baron Gevers, Minister of the Netherlands at London, and the British Board of Trade. The report by the Sea Fisheries' Commission is practically a history of the branding of herrings in Holland, which, up till thirteen years ago, was compulsory. By a law which came into force on 13th June 1857, the system of optional branding, as practised in Scotland, was introduced in the Netherlands. Since that time the Dutch merchants, in order to maintain their position in the markets, have had nearly all their herrings branded, the few exceptions in which they were not branded being caused by special circumstances. The Commissioners were disposed to consider that, in the practice of branding, they had a proof that the trade thought the branding absolutely necessary, but experience, they say, has taught them that this assumption is not justifiable. The official mark has failed as a guarantee of the excellence of the fish, and given rise to the use of spurious brands. The Commissioners go on to affirm that, from day to day, complaints are made of the gradually growing badness in the quality and dressing of the genuinely branded herrings, and the brandmasters are unable to check the packing, since the packers are no longer sworn. The brand thus increases the gain of those who fill the casks with inferior fish, while it undermines the credit of the Government, who give the guarantee, rather than that of the merchant who sells under it.

The Dutch Commissioners, for the above reasons, advise the Government of the Netherlands to abolish the system of optional branding, subject, however, to the condition, that they should previously prevail upon the British Government to adopt likewise, and simultaneously, the same course. To abolish the system in the Netherlands, while it is retained in Scotland, would, the Commissioners say, be infinitely objectionable, because it would expose the herring fishery of the Netherlands, now in a fair way of development, to very material dangers. Scotch herrings, the Commissioners observe, dominate in the foreign markets, and the Commissioners think that, if they were to continue branded, while the Dutch herrings were unbranded, the latter would be looked upon with suspicious eyes, and undergo such a diminution in value as would render it impossible to carry on the herring fisheries. The Commissioners, therefore, propose to open communications with the English Government on the subject.

In accordance with the recommendation of the Commissioners, Baron Gevers communicated, on 26th Oct. 1869, the report, of which the above is an abstract, to the Foreign Secretary. The Foreign Office in turn submitted the matter to the Board of Trade, and, on the 23d November 1869, that department asked the Foreign Secretary to state to Baron Gevers "*that the Board of Trade are, and have long been, of opinion that the arguments against the system of branding herrings have much greater force than those advanced in its favour*, and they would be disposed to agree with the Dutch Govern-

ment that the system should be put an end to in both countries, not probably by treaty, but by concurrent action. But as the abolition of the brand involves other questions of considerable difficulty, with respect to the Fishery Board in Scotland, the Board of Trade have felt it their duty, as a first step, to submit Baron Gevers' proposal to the Lords Commissioners of Her Majesty's Treasury. Upon hearing from the Treasury, the Board of Trade will communicate again with the Foreign Office."

Agreeably to this intimation, the Board of Trade submitted the whole question to the Treasury; and on the 23d November last, the Secretary for the Treasury wrote in reply:—"I am directed by the Lords Commissioners of Her Majesty's Treasury to state, for the information of the Board of Trade, that they hold the system of the brand in Scotland to be quite indefensible, but that they fear that the pressure of business will preclude them from taking measures for its abolition in the coming Session."

The Board of Trade transmit to the Netherlands' Minister a copy of the letter from the Treasury, and for the present the matter ends. But it is impossible that the affair can terminate thus. A Board condemned in this manner by the Board of Trade, and by the British Treasury, cannot survive. Those engaged in the herring trade may see in the correspondence fair warning that the fishing of season 1872 will be conducted under private brands.

THE HOME FOR EMIGRANTS.

TO a man of leisure, the advertising columns of a London daily paper afford ample opportunities for reflexion. In the matter of emigration alone, the idea is very prominently brought before us, either that the many advantages of our North American Colonies are not sufficiently made known to desiring emigrants, or that our American cousins present their fields in brighter colours, and so win the greatest number of those who seek to make for themselves anew, "a local habitation and a name."

These advertisements almost daily appear. One under head of "Employment," states that the United States and Canadian Emigration Society are prepared to send all willing *persons*, of whatever business, to immediate employment. Does this mean that such *persons* (the word is printed in capitals) will be sent *free*? Is it to be inferred that employment awaits all willing to work? I imagine that it means neither; that the notice emanates from an emigration office desirous of obtaining a commission from any line of steamers, to whom they recommend passengers, for I cannot conceive that any society can truly undertake to provide work—"*immediate employment*"—for all willing persons.

The next is one emanating from the Immigration Board of the State of Nebraska, U.S., respecting which every information, and a pamphlet, is furnished by the Commissioner, W. H. Hayward, Esq. This *State*, the thirty-seventh, was admitted into the Union in 1867, the Territory having been first brought into notice by means of the great Californian Emigration in 1849, and so rapid was the progress made, that the territorial capital was *located* in 1854—population increased—and, as has been stated, thirteen years afterwards the humble Territory took rank amidst the stars of the Union.

This State has a width of 130 to 200 miles, is about 400 miles long, has an area of 77,282 square miles, or nearly 50,000,000 acres, a great portion of which is declared to be quite equal in fertility to any portion of the United States.

The position of Nebraska, as may be seen on the map, is most advantageous. The great bulk of travel and traffic to the Pacific must pass through her valleys, and her future must needs be great. The country is well-described, its general surface and division by the Platte, the Nisbara, and Republican rivers. The principal towns are mentioned. Omaha, a marvel of American enterprize and energy, has already 17,000 inhabitants, and from her position as re-

gards numerous railways [or railroads, is already "mistress [of 'the ,situation, and able to control circumstances."

Lincoln, in Lancaster County (both good old English words), is the State capital. It has already a State House, insane asylum, a university, and a penitentiary, costing 150,000 dols. each. The foregoing and Nebraska [city seem to be the principal towns.

The accounts given as to *climate* may be summed up thus :—"It is the English State of the Union, save that it is free from fogs and damp atmosphere"—(Great Britain whipped the world—we whipped Great Britain—She has the finest climate in the world, *but* Nebraska beats it).

There appears to be not unfounded reason to apprehend *droughts*, notwithstanding an elaborate table of the rainfalls from 1863 to 1869, this may be compensated for by the nature of the soil, which "enables vegetation to resist alike exhausting drought or excessive rains. Cattle, horses, sheep, swine, all flourish well. Fruits are in abundance, and in many sheltered spots the strawberry crimsons the earth with its fruitful profusion. Young trees literally bend to the ground with luscious apples, and the native grape *climbs to the tops of the highest trees, binds* them to their neighbours in the forest, and hangs loaded with clusters in graceful festoons.

Timber is deficient, but it is found can be done without until the the trees, planted in accordance with an Act of the Legislature to encourage planting, are grown. This is making the best of everything.

It may be questioned if the Geological Survey, already made, can be relied on; but there are coal, salt, marl, and peat, limestone, sandstone, and clay. In the State thus described, there are "free homes for all."

Every *settler* can select a farm of 160 acres of land, if beyond 20 miles of a railroad, or of 80 acres, if within that distance. And the price! A fee to Government of £2, 10s., payable after the selection of the land, which is free from taxes until after the expiry of five years' actual settlement, when a title is granted. I understand, also, that this land is not liable for any debts contracted by the holder prior to the issue of the title or patent.

No wonder the United States drain us of our best agricultural labourers, our most industrious artizans. No wonder complaints come from Canada of the non-success of emigrants, who evidently imagined that everything was to be done for them. The United States offer the greatest stimulant to exertion—"a free farm or homestead," asking only that the actual settler shall cultivate the gift.

Nor need the agriculturist alone apply. Mechanics of all kinds, clerks even, have but to cast off foolish pride, and work to gain a surely better reward than is offered in another advertisement, reading thus, "A Competent Bookkeeper Wanted. Salary, £60. Address ——, stating age, references, &c." Indeed! . . . The Rev. Mr Beecher truly said, the other day, that no man should *work cheap*, and although in this over-populated and over-taxed country many a poor fellow is compelled so to do, an opportunity is now given by the State of Nebraska, "the youngest of her sisterhood." and the first that came into the Union, under the motto of *equality* under the law, by which he may work for himself, and be no longer passing poor on £60 a-year. . . . . . . A *competent* bookkeeper at £60 per annum! A person so gifted must have been well-educated, must dress well, and from his education and habits must occasionally mix with a different class of men than labourers, who are better paid by far. Many a young man must be better, physically and mentally, if he burst the golden chains offered in the advertisement, and turned his hand to anything, in a land where a free farm cannot only be won, but is offered.

I am aware that an outcry may be made by landlords and advertisers for cheap labour: as to all this, men who act as if they thought the rich should become richer, and the poor poorer, and who declaim loudly respecting the rights of capital. Labour has never had a proper, fair, chance in these Islands, to compete with capital so that its so-called *rights* are simply fictitious. It may again be urged against emigration to Nebraska, that many cannot afford the money to take them there; £10, 18s., which includes provisions, is the price charged. A sum within the reach of most, but then the idea of going in the *steerage* frightens many above the (so-called) social scale of agricultural labourers or mechanics, and I believe it would do good if Mr W. H. Hayward would send an intelligent, educated man—yes, say a gentleman—who should proceed *incognito*, by the cheapest mode of transit to the State for which he is the Commissioner, return, and give a true and faithful account of the dangers he has passed, the incon-

ces, &c. The men who care for such, er, are not the men "wanted" in a State ıs Nebraska.

ustice to myself, I may state, that I never heard of Mr Hayward, and know nothing youthful State he represents, until a few ince, when a friend shewed me a copy of mphlet, and also a paper called *The Free* for which latter he had sent, enclosing tamps in accordance with an advertise- receiving in return the valuable journal aid, dated Nov. 12, 1870, and which is re- ıted to be a weekly newspaper. It ought to n "The latest American and Home News," ımerce," "Emigration, shewing where grate, and why;" "Wants of Labourers, ns, Mechanics, and Professional Men in ıited States and Canada." The copy of the *Vest* (a weekly paper), sent for by my friend, ɔruary 1871, is dated, as before stated, No- r 12, 1870, and does contain a very boyish on "The Best Form of Government," in the writer treats the readers of this weekly aper to animadversions on "Men of the stamp," a story named "Travelling on Tickets," another on the "Council Bluff," ı stunning article on the "Erie Protection ittee," "Removal of the Consul-General nce," "Tom Brown Abroad," "The Little ɔnce," "Italy and Rome," "Jolly," "The ɔss at Chislehurst," "The Emperor's ıation of his Misfortunes," "The Spoil tz," "Good Riddance of Bad Rubbish," Crown of Spain," "Anthropolical Society ıdon," "The Chivalrous Gambetta," "Soft r, from a Reverend Courtier," "Star- in Metz," "Afraid of his Virtue," "The ɔ Nazin of Bengal," and so on, until page reached, when two letters from emigrants . Then the anxious question is discussed who ran the first American locomotive. Brakesmen of our Great National Rail- "A Story about a Newspaper Boy," Illinois ıwa, and such like, then a List of Passen- Arrived, Latest News. (*mirabile dictu!*), ıber 1870! "Who are the most suitable apted persons for the United States and a," in which, to speak truly, there are some sensible remarks addressed to those not labourers. And now for a gem! "Official Meanness" has shewn itself in the Post Office, because several numbers of *The Free West* had been returned, because the halfpenny stamps thereon had slipped. It may have been on account of the *date* (November 1870-February 1871). Then comes the end, "A List of Wages paid in the United States and Canada," "An Emigrant's Outfit costing 9s. 6d.," "List of Fares to Canada and the States, "A short Compendium of the Homestead law, "United States Land Office," "A Few Cautions to Emigrants," who are advised to consult *this* paper; and the remaining sheets are filled with advertisements, the most important of which is devoted to the *Free Press*, a weekly paper (November 1870 - February 1871).

In *The Sportsman*, a few days ago, "The Casual," remarking on certain little playful eccentricities of conduct among a few American rowdies, wrote "Such is Life in the United States," and such is the advice to emigrants contained in *The Free West*, a weekly paper, (November 12, 1870-February 1871).

It is indeed a shame that so many strong, healthy, young men should be content to linger out a hopeless existence here, when they can avail themselves of such a tempting offer as is held forth by the State of Nebraska. By remaining here they only lower the price of labour, thereby hurting others, while not benefiting themselves. I wish Mr W. H. Hayward every success. May his State flourish! I promise that if ever my health, not improved by residence in "another place," as they say in Parliament, will permit, and my time and means allow, to pay a visit to that land, the valleys of whose rivers are the gateways to the mountains, and through which the Mormon—why does not that benighted individual stop there?—seeks his land of *promise*. Promise, indeed! Nebraska performs, acts, in giving 160 acres as a homestead—such a fine old Saxon word that is to all actual settlers. I must try and find out what the Dominion of Canada has to say. In the meantime, Mr Hayward, I look towards you. Long may you wave!

DUN-EDIN.

AMERICAN AGRICULTURAL NEWSPAPERS.

IT is always pleasant to hear the opinion of outsiders about agricultural newspapers, there being a freshness in their views which those constantly engaged in conning over the pages of these journals, day after day, cannot possibly feel. Our competent correspondent, "Dun-Edin," since returning from his wearisome sea-voyage, has been perusing some American papers, and here is what he, writing in an editorial way, says about them:—

We have received *Moores' Rural New Yorker* to the 11th inst., and *The Country Gentleman* from Albany, N. Y., to the 2d inst, and trust to have the pleasure from time to time, of perusing such excellent contributions to agricultural literature. The first named is an illustrated weekly paper, comprehensive in its nature, being devoted to agriculture, horticulture, rural-life, news, literature, science, and the arts. The sketch of three buff Cochins, owned by Isaac Van Winkle, Esq., of Greenville, N. J. (no descendant, we must presume, from his activity and zeal, to the famous "Rip Van Winkle," immortalized by Washington Irving), is a very creditable production, by Mr A. Hochstein. The description of the "great farm" belonging to Mr John T. Alexander is very interesting, and we wish that enterprizing gentleman every success. The Dairymen's Convention is a move in the right direction; but we must join issue with Miss Jessie Colman in her humorously clever article, entitled "Fat, Frying, and Boiling." We have sent the article, entitled "Crotatus Horridus, or Rattlesnake" poisoning by its venom, and treatment, by F. G. Hayman, M.D., to one of our Indian exchanges. The opinion has long prevailed in the East, that rattlesnake bites were incurable, and, indeed, experiments are still being carried on, which, however, as yet confirm a contrary result to that described. If iodine is indeed a specific, the discovery will be hailed as a boon, and we sincerely hope Dr H. may yet receive his best reward in the knowledge that he has benefited his fellow-creatures. The repeal of the 20 per cent. duty on live-stock is a very proper resolution, and we assure our American friends, that if such a policy prevailed, we should hear less of the decline of their maritime interests, as illustrated, in a late report, by Mr John Nimmo, jr.

The account of the Pennsylvania Fruit Growers' Society is highly instructive, but we beg to assure Judge Rowe that his British ancestors object to be alluded to as "dry bones." Here, as across the Atlantic, we hail every beneficial change, and are fully alive to the necessity of "awakening" people, and influencing their minds with progressive ideas. But why should the *Rural New Yorker* so quietly snub Mr T. G. Montgomery, who is jealous of the word *English*, as applicable to the British Empire? That gentleman is right, inasmuch as that, according to Act of Parliament, the southern portion of this island is to be described as that part of the United Kingdom called England. We recommend Mr Montgomery to read the *London Scotsman* of the 4th December, and send him a copy thereof, addressed to the *Rural New Yorker*.

We turn with pleasure to have a friendly gossip with the *Country Gentleman*, who discourses weekly on "the farm," "the garden," and "the fireside." We like the frank, manly way in which Mr J. Chapman, of Cincinnati, asks Mr Bartlett for information, and the ready courtesy shewn by that gentleman in his practical reply. Even the fertile soil of Illinois, we gather, shews deterioration already from the absence of manuring. We cannot agree with the article on "Co-operative Agriculture," but believe in the concluding words thereof—the beauty of agriculture, farmers' clubs, and colleges are (so) working that the farmer of the future will work in a clearer light than by the suggestions of "Zelco."

We will gladly learn the results of Mr Jonathan Talcott's experiments with seed potatoes.

On a future occasion we hope to refer to the proceedings of the Western New York Horticultural Society. Meantime, we are glad to learn that a new peach, from Mr T. Rivers, of Sawbridgeworth, *Old* England, has "fruited, and proved of excellent quality."

We have consulted our landlady as to the *toothsome* cake without eggs alluded to, in "Domestic Economy," and she offers to make an

:, the respective merits to be decided ıvenile members of *The Country Gen-* family, if he has one.

ticle under the heading "Relief of the 'easantry" is a truly excellent one, and y see in this unanimity of feeling be- reat Britain and the United States, a at the kindred nations should ever go hand in such acts. There is no petty as to the organizations already in England for the aid of the French, and £10,000 and upwards has already been received from New York!

The time has, indeed, past when, as Sydney Smith wrote, there are no American books to read. If that facetious divine lived now, he certainly would not say so; and as to agricultural journals, he would feel bound to confess that for general utility, they equal similar productions in Great Britain.

READING AT SEA.

IY, the elder, we are told, once re- arked, "There is no book from which : be derived some amusement or instruc- And Mr Pliny, senr., was right.

oys of reading, however, are unknown to ordinary circumstances. A business ads very frequently after a hard day's ıore for relaxation, than in any hope of ıg amusement or instruction. Literary ıd as critics, or as a part of their business; with many others. I claim that the l delights of reading anything are known those who have been in Whitecross Street, d to a sick room for a long time, or who :en tossed about for months in a sailing as passenger. In the fond hope that f my readers have been in a debtor's I can only hope that they may never the miseries of long confinement to a sick

My own experience is, that from the [was carried on board a sailing vessel, ıt I lay for many a weary day and night ng "every minute to be the next," as the :s say yellow fever patients feel; too faint to sit up, yet ever anxious to be on o as to breathe the invigorating sea air, nging for that far away home it might not lot to see again. I well remember being o the sacred precincts of the Captain's to see what book I should like to read. ten do we carelessly throw down a volume "I have read this before," and then de- here is nothing to read! Listen to the ue. Shakespeare, and the Boy's Own Bunyan's Pilgrim's Progress, a Treatise ıigation, and the Scottish Chiefs; Life in ent, and Baxter's Saints' Rest, Chambers' ation for the People, and Aimard's many d Tales of the Prairies; a few numbers of the *Illustrated London News*, an old issue of the *Agricultural Journal* stitched to a *Sportsman*, a New South Wales agricultural report, the *American Agriculturist*, the *Home Journal*, and a torn and well-worn pamphlet entitled, "What I saw in Whitecross Street." To these, add a few numbers of the *London Chronicle* for 1815, and the stock of knowledge was before me. Where the last-named loose periodicals came from, no one could tell. My own opinion is that they had been collected by some eccentric Custom-house officer, from the *left* articles of previous passengers.

Some wandering Scot must have owned the *Journal*, an English, Irish, or Scotchman may have owned the *Sportsman*. From what State did the citizen come, who doubtless found something to bring up memories of Columbia in the agricultural papers, and who had passed so many weary days in Whitecross Street, that now defunct relic of a barbarous custom? Ah! many a sad thought may have been the result of their perusal "far, far at sea." Where are the owners and the readers now? Has the instruction contained in the *Journal* brought forth fruit in foreign lands? Have the lessons therein taught the Scot to make some desert blossom as the rose, or the *Sportsman* kept alive racy feelings in the Antipodes!

Such thoughts formed the subject of many conversations, for this batch of stray literature was discovered by accident in a locker. Anything to read! I should think there was; plenty of time to think as you read and find out beauties never seen before. How we used to laugh at Shakespeare's "Tempest." Lord Campbell once wrote a little book proving that from internal evidence Shakespeare must have been a lawyer, but wound up by saying that by the same evi-

dence, such was the versatility of his knowledge, it could be proved he was of any other business or profession. My belief in his lordship's opinion is now considerably shaken. The Bard of Avon was lamentably ignorant of "things consarning the ocean wide." Our gallant skipper declared him to have been "a duffer," and the mate said the only sensible words used by the boatswain were those ordering the passengers to keep their cabins.

Nothing to read in the "Boy's Own Book!" I should think there was, and many a merry laugh was caused by its perusal; nor this alone, we referred to its pages in disputes on chess, draughts, and cards, and felt ourselves boys again while reading the games which, as "The Duke" said, "won Waterloo." To me the volume was sacred, recalling, as it did, memories of my last little boy whose happy face can no more be gladdened by papa's stories of games—"eheu mihi."

Nor is Bunyan to be read merely as a Sunday book. Shall I recall Macaulay's brilliant essay thereon? I'd rather not, for, in fact, "Navigation" began to occupy my serious attention. People travelling by land take things as matters of course. They leave Paddington station at 9.45, and arrive in Liverpool at the appointed hour, but those who go down to the sea in ships must know their whereabouts with precision, and a little careful attention to a book on this all-important subject, will so instruct that it may be seen with what accuracy the position of a vessel on the ocean can be ascertained. Do we not all remember the finding of the lost cable in the Atlantic? And the "Scottish Chiefs!"—a well thumbed volume this was. The carpenter, a native of Ayr, asked what I was reading one day, and his weatherbeaten countenance lighted up as he heard the name. "*Dam* thae English, they didna' hang his living body ony hoo," said he. I endeavoured to explain that the Knight of Ellerslie was really suspended and properly killed. "Na, na, sir." So it is ever; we will believe pleasing fictions instead of sad realities. But the periodicals and pamphlets were indeed sources of intense delight. On the the 31st May 1815, the *London Chronicle* stated that there was in the states of Georgia and Carolina 180 and 120,000 bales of cotton respectively, which was more than the consumption of Great Britain for any one year. The *Illustrated London News*, now before me, gave startling evidence of the victories of peace. No longer dependent on America for the staple, the Manchester Association seeks in every clime for the wherewithal to feed the gigantic machinery of the north, and they persistently send out practical information that cannot fail to be a benefit to cultivators of the cotton plant in all parts of the world.

In India they will find their greatest difficulties. There are wanted good seed and good machinery for cleaning. Gins are sadly wanted there, and it would pay to buy ordinary cotton, clean, and ship free from seeds and dirt, which but increase cost of freight. A friend of mine has been experimenting with Sea Island cotton, in the Soonderbunds, near Calcutta, and I know would give anything for a good gin. The quality raised already is excellent.

The agricultural intelligence of 1815 was not as that of this day. There was no *Journal* then with its accurate reports and information. Bakers used to play tricks, which Dalglish's system and the Adulteration Commission have done away with. Where are the advertisements for all kinds of improved tools, steam ploughs, and cattle shows?—not to be found chronicled in the *Chronicle* of 1815. The United States farming journals are excellent productions, and one is struck by the mixture of the contents—illustrated tales, receipts, experimental gardening—no pretence of writing to purely scientific men, but to honest hard-working men—new toilers. Will my trans-Atlantic friends, and I have many and dear ones, pardon me saying that, from the evidence before me, I should judge the farming community in the States are not so advanced as the general readers of *Journal*, of which, too, I only speak from the solitary issue alluded to.

There were sporting men in 1815, if not a *Sportsman*. Pedestrianism was in great feather then. No betting-lists seem to have been published; no Frank Buckland had appeared to all but rival dear "old Izaak;" no "reliable information" as to the performance of this or that horse. What a treat for a turfite of the olden time to rise up, get on board a ship, and read the *Sportsman* in the Indian Ocean.

And there were Dr Cummings in those days. Long letters appear on unfulfilled prophecies, and, strange to say, they name the present as a time of wars, and rumours of war; and Napoleon, my uncle, came in for his share of satire—

> "Codrus his patriot life did gladly pay;
> Nap. saved himself and France—*He* ran away.
> One died for country, who is there can doubt it?
> Whil'st t'other lives—for what? to talk about it."

And, lo, as a copy of these lines was written, on

French vessel was signalled, the captain boarded us, bringing with him French journals announcing the *capture of Napoleon III.*

Thus, history repeats itself. Were it for nothing but the opportunity of comparing the position of the agricultural interests of the world *then* and now, I should be content to spend many more days at sea, and I would fain endeavour to impress on all the journals devoted to such interests, that much is still required of them. Cannot the culture of rice be improved? Cannot steps be taken to ensure our fellow subjects in India against the famines by which they are frequently and sorely tried? There is still room for exertion in the noble cause advocated by *Journal* in this country, and by the American *Agriculturist* and the *Home Journal*, of similar nationality and aim.

I began by asserting the correctness of the remark attributed to Pliny the elder, and leave to my readers to judge whether or not I derived amusement or instruction, under adverse circumstances, from the few books, &c., at my disposal.

Agricultural Engineering.

TRACTION ENGINES EMPLOYED BY THE GERMANS.

THE following details respecting the practical application of mechanical forces to the purpose of war, will probably be read with interest at the present moment. The Prussian Government has employed, ever since the commencement of the campaign, two powerful traction and winding engines of English manufacture—by John Fowler & Co., of Leeds. These engines were used, during the seige of Toul, for conveying ammunition and provisions from Pont-a-Mousson to Commercy. They have also transported, on the same road, for a distance of 40 kilometres, a heavy railway locomotive, sent forward to open the traffic on the line to Paris by Epernay. Subsequently they were employed in dragging siege material, guns, and ammunition, from Nanteuil-sur-Marne to Villeneuve St Georges, but they were unable to proceed farther—to the artillery park at Villacoublay — because all the bridges over the Seine were destroyed. During the time expended in the construction of the "Chemin de Fer Détour" around the blown-up tunnel at Nanteuil, a powerful railway locomotive and tender were transported from Nanteuil (by way of Bussieres and La Ferte-sous-Jouarre) to Trilport, partly to try the railway bridges between Trilport, Meaux, and Lagny, repaired by the Prussian Field Railway Department, partly to be applied to the traction of material for repairing the line as far as Chelles. Recently, these engines have been again taking siege material from Nanteuil-sur-Marne by way of Corbeil to Villacoublay, and they are still plying between those places. Each engine is of (nominal) twenty horse-power, but works at high pressure (120 lb. to a square inch) up to three times that power. They are constructed to travel at two speeds—by the quick-speed gearing, engine and load are propelled at 5 miles per hour, by the slow speed at 3 miles. In transporting railway engines or other indivisible loads, the slow speed is used, but for other purposes the quick speed is invariably preferred.

Between Nanteuil and Villacoublay three valleys have to be crossed—those of the Marne, the Yeres, and the Seine—each causing gradients in the road of from 1 in 12 to 1 in 10. The engines easily take 20 tons a-piece up these inclines, and always arrive at their destination an hour or two before the munition columns, plying on the some road, and starting simultaneously with them from Nanteuil. They are fitted with winding gear and a steel rope 500 yards in length. This is an important improvement in traction engines. In transporting heavy railway locomotives the winding gear has been repeatedly used. When the engines meet with an incline up which they cannot haul the load by direct traction, they move up the hill empty, and then drag the load after them by means of the rope and winding gear. During the time the engines were plying between Nanteuil and Villeneuve St Georges, the siege ammunition transported by them used to be taken by horses from the latter place to Villacoublay. At each journey fifty-four horses were required to convey to the park the load brought up by one engine. Considering that there is no difficulty in finding coals hereabouts, at railway stations, or in factories not at work, the cost of transporting siege material is infinitely smaller by steam power than by horse power. Oats now cost three times as much as they do in time of peace. The prime cost of horses and their harness is much

ger than that of a single traction engine, nd the expenses of maintenance are greatly ss for the latter—especially in winter, when orses require stabling. Often during this ampaign, and even at the present moment, reat difficulties have been experienced by he authorities in beginning traffic on the ailway lines of a newly-conquered territory –the French having taken good care to remove all their locomotives. Nothing would be easier than to furnish the road steamers with spare wheels to fit them for running on the rails. There can be no doubt that this campaign will do much to develop steam on the road. The engineer in charge of these traction engines is Mr R. Toepffer, a Prussian who has lived for a considerable number of years in England.

SELECTION AND MANAGEMENT OF AGRICULTURAL IMPLEMENTS.

By Mr H. Holborrow.*

CONSIDERING the vast amount of mechanical and trading interest connected therewith, it seems strange that such a subject should have been allowed to remain comparatively neglected. What would the farmer of the present day do with implements such as existed forty years ago! Why, you would put back a great part of the agricultural progress of the present day along with them. The landlord would have to take a less rent for his land, the farmer would be put to more cost with less return, the labourer would retrograde in intelligence, the whole nation would be an enormous sufferer. Whilst mere discussions on the subject have not yet furthered the matter much, the Royal Agricultural Society, and other kindred societies, have done an incalculable amount of good in this particular; I feel almost disposed to say even more good in the improvement of agricultural appliances than in the improvement of live stock, great as that is. By means of the annual exhibitions, tests, prizes, and so forth, the manufacturers have got to perceive what is required. Mechanical genius has been brought to bear, large establishments have sprung into existence, the requirements have been met, the farmer has got into a better method, the nation has reaped an enormous benefit. Let us pass by for a while the money-making considerations of increase of crops, increase of meat, cheese, butter, &c., or even saving of cost of production, and turn to the more humble subject—viz., the tool by which it is done. We cannot dig without a spade; we cannot haul together without a waggon or a cart, and it seems as though we cannot *now* thrash without a steam-engine (perhaps we sha'n't be able to plough without one soon). We want all these and lots more; we also want to have them good and efficient, and then to know how to use and take care of them when we have them; but there is something we do not want, yet which many have, and all are in danger of getting forced upon them—a lot of costly implements not actually required on the farm, and only occupying the room the others should have. I said "forced upon them;" well, I may say, tempted to purchase also; for we all know what it is to be bored by importunate agents, when we attend a market, to give an order for what we do not actually require, as though they knew better than ourselves (not that I mean to object to a respectable tradesman seeking in a becoming way to sell his goods), and I dare say most of us know how tempting many of the nicely painted, graceful-looking things are

* Paper read before the Kingscote Farmers' Club.

to the eye when visiting a show-yard; perhaps we may have been overcome in this way too.

ADVICE AS TO SELECTION.

But to the first point—the "selection" of farm implements; what shall we say? what advice shall we give? Let us suppose a young man to be just entering into a farm where he has everything to buy that may be required; whether he possess abundance of capital, or whether his means be somewhat straitened, we will not stop to inquire; we will suppose that he has enough. Let him consider the nature of the soil he has to till—whether it be light or heavy, wet or dry, hilly or level; the system most suitable to the locality, &c., the articles he will be compelled to supply himself with, and those he can manage to do without for a time. After this he may begin to purchase; but where is he almost sure to begin? Why, at the first auction of farming stock within his reach, and there he buys a lot of things *half* worn out at *three-fourths* of their cost when new, not of the most improved plan, and a carpenter and a blacksmith will have to be set to work very soon to repair them. Thus a great mistake will be made at the outset. We would say, then, don't begin here (although there may be some few exceptions, it is true, such as expensive things to buy quite new, and which may only be occasionally required —like waggons for harvest purposes), but go rather to where new things are sold, and of the best quality. It will be wise to attend a large agricultural exhibition—it is well for all of us to do so occasionally—and there see and compare the different articles as turned out by different manufacturers; but always go to the best makers, and give them their price for the best articles, and you shall have by far the cheapest in the long run. Don't be hasty in purchasing new inventions because they look likely to answer the purpose; let them be tried first, and if they are found to be on correct principles, they will be improved on, and made more complete very soon. We have known many very likely-looking inventions, and that have sold freely for a time, which have soon been put aside in the corner of a shed as useless lumber or a perch for the hens. Allusion has been made to agents for selling implements, and they are a very useful class of men in their way; only, don't go to them for advice, exactly, or you will be sure to be recommended to the very article *they* are most interested in selling, for they cannot be the best judges of practical merit. Never go to small country makers for new waggons and carts, but go to large makers, who keep the best materials, and put them together in the best manner, and be willing to give the *best* price. There are many implements on the farm which used to be made chiefly of wood, but can now be had made of iron. Choose the latter in preference to the former; they are far more durable, cost less for repairing, and are always worth something for old iron when the others would be rotten or only fit for the fire. Try to obtain proof of the practical efficiency of an implement before you buy it, and if it be recommended by a farmer whose soil is different to yours—that is, if it be for working the soil—hesitate, and get further proof if you can. Any article of any kind used on the farm which you have not proved, try and get a sight of in actual operation before purchasing—see one of the kind at work, I mean. I went once to the Royal Agricultural Show, and there saw a horse hoe for roots, which was to expand and contract at the will of the manager when going along, and it appeared to be such a capital thing that I ordered one at once. During the day I met an old and experienced farmer, to whom I spoke of the implement, and he at once said, "O yes, I saw it and ordered one myself; the best new thing in the yard." Well, we both had them sent, and what became of his I do not know; but I know that mine had to be sent to the blacksmith's shop, and there altered into the same simple kind of hoe that he was making at one-third less in cost price, before it could be used at all. Many have been similarly deceived in more costly articles; therefore caution is particularly recommended in buying new inventions. Do not buy *one*

article which is intended to do the work of *two;* such as drills for general purposes, combined reaping and mowing machines, for if you do, you will get double trouble, double expenses, and the work not half so well done, it is better to have them separate. Don't buy any old things, especially old carts and old harness, or you will soon make up the price of new by paying for repairs. Don't buy anything because it appears to be cheap, if you do not actually require it, or it will be as dear as the amount you give for it. Don't buy a thing with the notion so commonly expressed, "That it will pay itself out the first year;" if you doubt this, try it on every year, and see where your profits will get to. Seek to have a good implement of every kind you may require, and no more. Try to find out the best makers; the best plan; give them their price, and you will have the cheapest article you can procure. Competition will always keep things within a reasonable price, and no maker can turn out a good article without a fair profit; *cheap*, in this respect, always means deception.

NECESSITY OF PROTECTION FROM WEATHER.

And now this will lead us to the next point —their "care and general management." Two things will at once present themselves —viz., protection from the weather, and from the rays of the sun. All wood-work exposed to wet will go to pieces in less than half the time of that which is kept in the dry; will never be in such nice condition for use; will cost double, and more than double, for repairs, and there is nothing which requires more to be attended to than this one thing; especially does it apply to waggons and carts. But the rays of the sun will have great effect in contracting, warping, cracking, and otherwise injuring wood-work of all kinds. The man who allows his property to be carelessly exposed to these influences, will require two new sets in twenty years, when that which is well protected will be still in fair working order at the end of the same time. Painting is also a desirable thing; even iron implements will pay for an occasional coat of paint, but especially wood-work; but let the colour be light for everything that is likely to stand out in the sun in the heat of summer, as dark colours attract and absorb the heat so much more than light ones. Iron things exposed to continual action of the weather are also more likely to become crystalized, and therefore to snap in two, than they would be if sheltered whenever it could be done. But repairing is a great consideration. You know the old adage, that "a stitch in time saves nine," and it is especially true in this case. A little flaw may soon become a wide breach, and the consequence might be costly repairs, without restored efficiency, and great loss of time added thereto. A shaky wheel, a worn ploughshare, a blunted coulter, a twisted harrow, a cracked axle-tree, may cause a sudden break-down on the road or in the field, and thus stop both men and horses, or otherwise cause a slower yet more laborious process, work badly done, and all sorts of hindrances and inconveniences. If, then, you would save risk, expense, loss of time, decay of your property, have your work well done and all things as they should be, keep your implements in the dry, away from the sun, well painted, in thorough repair, and always in proper working order, remembering the proverb of the wise man, that "if the axe be blunt, he must lay to the more strength. The *axe* does not suffer, but the one that handles it. "A broken tooth," or "a foo out of joint,' should teach every one a similar lesson

The Farm.

IMPORT AND EXPORT OF AGRICULTURAL COMMODITIES.

THE Trade and Navigation Accounts for the month and two months ended February, have been issued. They shew a slight increase on the month in cattle, but a decrease in the two months. Of oxen, bulls, and cows, we received this year, 6533 as against 5321 last year, but owing to the short supplies of January, there is a falling off on the two months as compared with the corresponding period of last year. We had a slight increase in calves, but a great falling off in swine, the number received last February being only 1676, as against 4581. This decline in pork was to some extent made up by a greater importation of bacon, the quantity received last month being 87,719 cwt., to compare with 62,975 sent to our shores in 1870. The decline in the supply of sheep is marked, there being only 17,759 landed, as against 30,120 in February of the year before. The total amount paid for the animals specified above, in the course of the two months that are past, was £702,484, as against £648,746. We paid, in addition, for salted beef, £133,016. We imported more largely of both butter and cheese; the amount paid for the former during the term for which the returns are made up, £891,073, as against £707,514; and for the latter, £313,266, to compare with £171,898. Were cheese-factories more common than they are in England, we are of opinion that a considerable portion of the money expended on foreign cheese would find its way into the pockets of the home producer.

Turning now to breadstuffs, we find, both in the month and two months, a considerable falling off in the imports of wheat, and a still greater proportional decrease in the other cereals and Indian corn. The total amount paid for wheat, however, in the two months, was greater by over £450,000 than in the corresponding period of 1870, owing to the increased value of the commodity. The total sum expended upon wheat, in the two months, was £2,866,054, as against £2,407,590 last year; for the other cereals and legumes, &c., £1,095,598, as against £1,773,925 in the like term of last year. The expense of wheat meal was £555,272, to compare with £489,007 in the same portion of 1870. The annexed tables shew the precise quantities and values for the month:—

QUANTITIES.

Wheat.	Month ended Feb. 28, 1870. Cwt.	Month ended Feb. 28, 1871. Cwt.
Russia	1,342,539	896,000
Denmark	11,598	—
Germany	75,830	18,190
France	840	—
Austrian Territories	14,629	3,000
Turkey, Wallachia, and Moldavia	50,606	61,251
Egypt	42,423	—
United States	704,697	962,526
Chili	—	—
British North America	—	14,623
Other Countries	29,918	406
Total	2,273,080	1,955,996

VALUE.

Russia	£587,361	£515,590
Denmark	5,267	—
Germany	39,469	11,471
France	403	—
Austrian Territories	6,644	3,314
Turkey, Wallachia, and Moldavia	20,528	30,919
Egypt	18,030	—
United States	343,566	598,962
Chili	—	—
British North America	—	8,064
Other Countries	12,907	297
Total	£1,034,175	£1,168,617

QUANTITIES.

	Month ended Feb. 28, 1870. Cwt.	Month ended Feb. 28, 1871. Cwt.
.....	636,788	419,274
.....	301,270	56,920
.....	16,979	1,647
.....	92,651	169,226
corn ...	1,379,592	585,281

VALUE.

.....	£225,075	£156,822
.....	99,577	24,014
.....	6,397	803
.....	36,317	78,375
corn ...	437,708	232,724

QUANTITIES.

	Month ended Jan. 31, 1870. Cwt.	Month ended Jan. 31, 1871. Cwt.
leal and Flour.		
.....	33,293	7,966
.....	76,840	930
tates	139,137	193,001
orth America	4,442	345
untries	10,862	86,107
otal	264,574	288,349

VALUE.

.....	£20,809	£6,757
.....	51,867	574
tates	84,641	154,478
orth America	2,758	228
untries	6,791	86,481
Total	£166,866	£248,518

ports of eggs have fallen off enor-

They are expressed in *great* and of these we only received th 73,796, as against 200,145 in of 1870, and the price amounted £30,152, as against £75,888 in the ding period of last year, and in the hs only £53,064, to compare with o. We are glad that there is this n, as it seems to indicate that e receiving more attention at home. we received 2875 cwt., to compare in February 1870. Potatoes came mall quantities last month, there miserable supply of only 144 cwt., 60,948 in the same term of last is diminution in the returns is doubt-y attributable to the Continental ell as to the excellent home grown st year.

Coming to manurial substances, we remark a great increase in the imports of bones, both in the month and two months. In the shorter term we received 6539 tons, while in the corresponding month of last year we imported only 3504 tons. The value of the bones received last month was £43,288, to compare with £22,339 last year. The demand for guano continues to increase, the quantity shipped last month being 23,000 tons, as against 18,454 in February 1870, and the respective expenditures £267,940 and £231,481. With regard to feeding-stuffs, we notice that oilseed cakes are in increasing demand, the quantity received being 11,667, to compare with 9325 tons; the cost being £102,244 and £77,131 respectively. Cotton seed has risen from only 5658 tons to 31,513 tons, and the amount paid for it in money from £49,779 to £287,369. This speaks volumes for the esteem in which it is held by feeders. There was also an increase in rape—24,242 qrs. as against 18,546 qrs., the values being £65,034 and £56,396. Flax seed and linseed shewed little change. Clover and grass seeds were more liberally imported, the sums paid for these last month being £132,238, to compare with £101,370, in the corresponding period of last year. Bearing in mind how much butter is adulterated just now, we feel no gratification in noting that we received in February of this year 137,544 cwt., as against 55,006 cwt. last.

There is a very large augmentation in the receipts of foreign and colonial wool, as the following table shews:—

Wool, Sheep, and Lambs.	1870. lb.	1871. lb.
From Countries in Europe...	401,344	2,847,713
,, British Possessions in South Africa.....	1,695,151	3,821,739
,, British India.....	358,291	1,141,293
,, Australia	12,250,003	15,945,706
,, Other Countries	275,625	2,209,191
Total.....	14,980,414	25,965,642

Turning to the export figures regarding home produce, we find a great decline in the butter trade, the quantity sent away being only 2923 cwt., to compare with 4094 (

in 1870. On the other hand, there was a greater market for our cheese, of which we exported 5014 cwt. as against 1892 cwt. The amount realized for butter in February was £17,304, and for cheese £19,916. During the month we sent to France 686 horses, more than ten times the number sent in February last year, and 73 went to other countries abroad, the value being £23,970, as compared with £4500 in the corresponding period of 1870. Our wool exports diminished in the month from 479,897 lb. to 414,916, France not being a customer at all. Belgium took more than half of the whole lot from us. The respective values of the wool exported during the month were—1870, £27,186; 1871, £31,232; so that there was a material enhancement of prices.

AGRICULTURAL RESOURCES OF INDIA.

THE *Times*, a few days since, commented on the information and forecast of the Hindoos, as evinced by their discussion, in the vernacular papers, of the probable cession of the French possessions in India to the Germans, and this, too, before such a possibility had been mooted in our own journals. Such discussion, "proceeding from such a source," does, indeed, the *Times* truly declares, furnish strange matter for meditation.

To any one long resident amidst and conversant with the better class of Bengalees, this is not, however, so very remarkable. Their habits of life, while unfitting them from active physical exertion, promote among the educated dreamy conceptions of what might or might not occur. Intercourse with men of standing among the natives will convince any one devoid of prejudice, that there is much to be learned from our Hindoo fellow-subjects, much to admire, and, alas, much to pity in them. The spread of education has taught this at least, that their best means of advancement is by now learning all in their power of that western civilization by which their destinies are ruled.

It is sad to think, however, that while every effort is made on the part of the native to claim fellow-citizenship with the *ruling race*, such efforts are suppressed in one way or another. Unless possessed of great wealth, the native gentleman is despised, and even "country borns" are looked on with contempt. This is endured, because the *vis inertiæ*, already alluded to, precludes the possibility of successful resistance.

But a short time ago, when the possibility of war with Russia was suggested, offers were made by the young natives of Calcutta and other places, to form volunteer corps. The proposals were laughed to scorn—the expressions of loyalty derided.

The refusal and derision may bear fruit not calculated "to contribute resources of incalculable magnitude to our power in India."

But it is not alone in political matters that the fertile imagination of the Hindoo finds subjects for contemplation. He sees before him, under the protecting influence of Great-Britain, bright visions of the future welfare of his own sunny home. Memories of the fabulous wealth of the olden time are ever before him, while the land was untrodden by the Moslem oppressor.

He wonders that no effort is made, save in few instances, such as in the culture of indigo and cotton, in the production of silk, by his rulers to develop the wonderful resources of Hindoostan. Railways have indeed developed the coal and iron wealth of the country, but until of late little has been done towards the true agricultural improvement of any portion of the country.

A few model farms, scattered here and there, amuse, if they do not occupy, the time of civil servants, and volume after volume of Blue Books is doubtless written without producing any effect on the much-to-be-desired

improvement of the great source of all true wealth—the soil.

The cause of this is simply that European capital has until lately been employed chiefly in the production of indigo, silk, and tea. The demand for cotton during the American civil war gave rise to much inquiry, to most voluminous reports, to the payment of excellent salaries to men sent out, but few effects are seen. It is not desired to ridicule the efforts made, so much as to state that such efforts are inefficacious so long as they are mainly the offspring of officials. The native is imitative to a great extent, and could he but see *really practical* men taking interest in agricultural pursuits, much would be gained. It is a mistake to imagine the climate of India is so deadly to the European constitution; but this idea has prevented the settlement of the actually industrious classes there to a great extent. The increase of railway facilities, the opening of the Suez Canal, the improved habits of life, will all tend rapidly to send to India a different class of men—men who will the *farm* country, be their aim to grow cotton, grain, or any other product. Cattle raising will also attract the attention of the men alluded to.

There are many places in India where the intelligent culture of cotton and rice alone would bring ample return for the outlay of time and money required; and as to the latter, it must not be forgotten that the cost of labour in every part of India is but an infinitesimal portion of the cost required in any other country.

The educated natives of India look forward to the rapid advancement of their country; they note the effects of speedy communication; the benefits sure to arise from scientific and sanitary improvements. They desire not only to have *results* shewn to them in model farms, but to see that Europeans apply such —"Yes, it is good—Why you not do.' This *has* been impossible, or nearly so, but a new era begins to dawn, a kindlier feeling will spring up than at present exists, for the taught will be grateful, the lessons being productive of substantial benefit. A class of men infused throughout our Indian Empire, *practically* superintending the working of the soil, will do more real good to India and to the Imperial Government, than all the laboriously written but unread Blue Books ever compiled. It should be the aim of agriculturists in this country to seek information as to the agricultural resources of India. The Hindoo, derided for his offer of service in time of danger, wondered at because of his prescience, will learn to feel there is an active and a ruling class in Britain, who rule his rulers, and seeing that action goes with precept, will join hand-in-hand with his practical British brother in developing the agricultural resources of his country. Without such aid, it will be difficult for any European, however conversant with the language, to succeed.

SHIRREFF'S "KING RICHARD" WHEAT.

MR PATRICK SHIRREFF, of Haddington, is never tired of experimenting upon his favourite cereal. For a whole life-time almost, he has been trying to reap "something new" in wheat, and has been more successful than most men. It is not mere novelty that he strives after; along with a new name, he desires that the variety he produces, by selection and crossing, should possess qualities superior in yield, colour, hardiness, or adaptation to climate, to anything in the market before. The Bearded Wheat, called after himself, has long been a favourite; in the recently issued number of the *Transactions* of the Highland and Agricultural Society, he gives us an account of another hybrid which promises to be a valuable addition to our stock of wheats. The Bearded White, he tells us, was a selection from a growing crop: the King Richard was obtained in a different manner. It is a cross between the Bearded White and the Talavera, and it is claimed for it by its hybridizer, that it is the only wheat of good quality obtained by artificial fecundation to be found in the United Kingdom, and his idea of its value, as will be seen from the letters we quote below, is borne out by the testimony of eminent farmers.

What led Mr Shirreff to undertake hybridization, in which others were unsuccessful, we shall allow him to tell in his own words:—

"Millers and bakers are favourably impressed with the properties of Shirreff's Bearded White Wheat, while farmers do not object to its straw, form of ear, and time of ripening; but it occurred to me that its seeds were rather too small, and with the view of remedying this defect, and still retaining the best properties of the varieties, it was fecundated with pollen from Talavera, reputed the largest and best grain in Britain. King Richard is direct from this cross, and in some of the most desirable properties of this wheat plant, is superior to both breeders. The straw is longer and stouter than the female breeder; the form of the ear is a medium of both breeders, with beardless chaff. The size of the grain approaches, if not equals, Talavera, and in quality is said to surpass either parent. Pursuing the course which I have hitherto followed with cereals raised by myself, I have made no attempt to test the properties of King Richard, but refer to the testimonials appended to this report as containing impartial evidence on this subject.

"Although the way of crossing one variety of wheat with another may have more than once been described in the *Transactions* of the Highland Society, I shall venture to detail the method which I have lately followed in carrying out this object. Having fixed on the varieties to be crossed, shorten the ear of the seed parent as soon as it is clear of the sheath, remove every alternate remaining spikelet, and leave only two capsules on a notch. The valves of the chaff may then be opened widely, and kept in that position until the anthers are removed from the floret and also anthers from the pollen parent are introduced, then close the chaff scales by gentle pressure of the fingers. The manipulations are best performed by two people operating together, the one attending to the valves of the chaff, and the other to the removal and changing of the anthers from the one floret to the other, which can be best performed by fine pincers. Let the florets of the breeders be near the same stage of opening, taking care not to break the anthers of the seed parent; but those of the pollen parent may be less carefully handled, the grains of pollen retaining their fertilizing properties for a considerable time. I have been more successful in my hybridization of cereals by completing the process at once, than by first removing the anthers of the seed parent and at an interval of days introducing pollen from the other parent. Finish operations by fixing to a

stake the mutilated ear, and surround it with a globe of gaze wire, which will be found an effectual protection from one ear rubbing against another, and also from the depredations of birds. With these precautions, the crossing of cereals may be carried out in the garden as in the fields."

The following are the testimonials referred to:—

"King Richard Wheat is highly appreciated by all who have seen it growing. One gentleman who grew it last year, and is an experimenter with wheats, says he means to grow no other sort for the future; and a miller, who saw some in the process of grinding, would not believe it was grown in this district, saying it was the most beautiful flour he ever saw in his life.

(Signed) "E. HENSLEY.

"Parkham Rectory, Bideford, Jan. 25, 1869."

"In answer to your inquiry about my opinion of your King Richard, I beg to state that, after two years' trial of its cropping, I am well pleased with the results, and have no hesitation in thinking that, as a new variety, it will prove a valuable addition to the wheats of the country, and take a high position wherever it is tried. Last season I had 13 acres sown with this wheat, about two-thirds of which was dry gravelly land; and so, in such a season as the last, unfavourable for a trial of every kind of wheat, notwithstanding, the 13 acres averaged 48 bushels per imperial acre. On the best part of the land, where the soil was deep and good, the crop was particularly bulky, the heads averaging from 4¼ to 4½ inches in length. As to the milling and baking qualities of King Richard, I cannot do better than send you the enclosed letter, which I have just received from Mr Hislop, on the subject; and as he has taken care to purchase all he could get from me, I think he may be considered a very impartial witness.

(Signed) "ALEX. BEGBIE.

"Barney Hill, Dunbar, Feb. 6, 1869."

"The wheat I have had from you of the King Richard variety is, without exception, about the finest I have ever made into flour; the quantity I have had of it enables me to say with confidence what are its merits—beautiful colour, strength for baking, and a produce far exceeding wheats of the same weight. Certainly, in my experience I never have had any flour that gave more general satisfaction.

(Signed) "DAVID HISLOP.

"Dunbar, Feb. 3, 1869."

"I sowed 1 quarter of your wheat, called King Richard, in the autumn of 1867, and being satisfied with the yield of grain and bulk of straw, I have sown 23 Scotch acres with this wheat for crop 1869. At present, my King Richard wheat is looking well, I may even say promising.

(Signed) "DAVID STOBO.

"Carlaverock, Tranent, April 12, 1869."

"I am now able to give you my candid opinion of your King Richard hybrid wheat, crop 1868. I never saw a heavier or better crop grow; and my only fault to it is its lightness in the bushel, which may, however, be owing to the season. At all events, this deficiency is amply compensated for by the large yield both of grain and straw, and also by the favourable report of the respectable millers to whom I sold the wheat, who state that the flour was rich, very white, and the produce most satisfactory.

(Signed) "ALEX. M'DOUGALL.

"Granton, April 15, 1869."

"For the last two years I have had some experience of your hybrid King Richard wheat, crop 1867. I had only four imperial bushels sown. I was so pleased with the general appearance of the grain and straw that I determined to sow all the produce for crop 1868. I had no reason to regret doing so, as I cut a most magnificent crop last autumn, the grain of first-rate quality, and the produce most satisfactory; and should the like occur this season, I will sow nothing else.

"I may mention I have this year 20 Scotch acres of King Richard looking remarkably well, the other variety growing on this farm being Hunter's wheat; so I will have a fair test of one of the older kinds against the new.

(Signed) "GEORGE HARVEY.

"Whittingham Mains, May 13, 1869."

SECURING OF HAY AND CORN.

By Mr F. SPICER.*

THE subject I have to bring before you is, "The best method of securing hay and corn"—a subject which, at first sight, appears to leave little room for discussion, as one would imagine most farmers must agree as to the management of these two things; but I venture to assert there is scarcely anything on which they differ so widely—that is to say, as regards the details.

MAKING WATER-MEADOW HAY.

Coming first in the natural order is haymaking, and I think the experience of the last few years has taught us that it is of equal importance to secure our hay in as good order as our corn. What little experience I may have in haymaking is chiefly of water meadow; I shall, therefore, direct my remarks more especially to that crop. Although many and great reforms have been made in agriculture, especially in substituting machinery for manual labour, yet I do not think we have a machine that will cut water-meadow grass in a satisfactory manner, however well they may answer in dry-mead, so that we must still depend on the scythe. There are, of course, parts in most meadows which might be cut in a decent manner with a machine, exclusive of the edges of the floats and drains; but, looking at it from a practical and economical point of view, I think you must agree with me that it is preferable to use the scythe. Supposing, then, the grass to be cut in this manner, the next process would be to tid it. Some persons have this done as soon as it is cut, whilst others prefer waiting a day, and this appears to me the wiser plan, as it allows time for the ground to dry between the swathes. It is obvious if the ground be wet the grass will be longer drying. Here again the nature of the ground prevents the use of a machine with advantage, as it is necessary to go across the swathes with it. If this were done in water meads, half of the grass would be thrown into the drains, &c., because in nearly all cases the swathes run parallel with them. So, taking one thing with the other, I think it the best plan to use the fork. But I should certainly prefer the machine for turning, as it does the work better, and at the same time much faster, which is not always the case. I believe it to be admitted on all sides that to make good hay the green colour should be preserved, and the hay made dry at the same time. To achieve this, the hay should be constantly kept on the move with the machine, and two women, one at each end of the pens, to turn up what hay has been missed by the machine in turning. If allowed to remain too long without this process, it would get scorched, which should, if possible, be avoided. The hay being dry, the next thing is to stack it. To prepare for this it must either be put in pooks or rows. I scarcely know which is the best plan. If it is pooked, an extra hand would be required to every two pitchers, in proportion to what would be necessary if put in rows; but perhaps it would be gained by the extra quantity put on the waggons. As to the size and shape of the stacks, they of course vary according to circumstances; but, supposing a large quantity to be required at one place, I certainly should not consider it the best method of securing it to make very large stacks; because, if so, it must be extra dry, or it is liable to get spoilt by heating. Some people are of opinion that too much hay cannot be put together provided it is dry, as they argue that it would improve in stack. This may be the case; but, at the same time, I can't see how grass, having once lost its natural properties (which it would do if over-dried), could regain them by such means. On the other hand, if stacks are made too small, there is a larger amount of outside hay, which, from exposure to the air, is of in-

* Paper read before the Winfrith Farmers' Club.

ferior quality. We naturally wish to get as little of this as possible. In avoiding it we should not go to the other extreme, and perhaps sacrifice the heart of the stack for the sake of a little outside. The shape is almost a matter of taste, but it should be remembered that a circular stack will enclose, in proportion to the outside, more than any other shape. I thing it a good plan, if possible, to put a little straw on the roof before thatching, as the top hay is frequently damaged; but I am afraid very few of us will be able to put this in practice next haymaking, as there will not be much spare straw in this neighbourhood. I have said nothing about the cost of cutting and making hay, as the price must vary according to the crop. I have, however, made a rough estimate, and I think it would cost about 15s. per acre, including everything, supposing it to cut two loads.

DRY MEAD AND CLOVER HAY.

There is very little to say respecting dry mead hay, as it is cut by a machine, turned by a machine, and collected by a machine; so that, compared to water-mead haymaking, it is quite a pastime—only make it when the sun shines. I'll just say a few words on clover hay, which, I suppose, I ought to have taken first. This is now generally cut by the machine, but I doubt whether this is the best method of securing it, as it is thus spread over a much larger space of ground than when cut with the scythe; consequently, in turning and pooking, the clover leaves are more liable to fall off than when kept in swathe, and this is what we particularly wish to prevent.

HARVESTING CORN.

I now come to the other part of my subject—viz., corn. In the good old days the harvest was looked forward to as a very serious business, and generally lasted from a month to six weeks; but in this, "the age of intellect," by the aid of machinery, it is reduced to about half that time, although there is nearly double the quantity of corn grown. On farms where a large portion of straw is consumed by the stock as fodder, wheat should be cut before it gets too ripe. The reaping machine has now almost wholly superseded the scythe and hook, and not only is the work done in much less time, but in a much better manner. The machines mostly used in this neighbourhood are Samuelson's, and I think it almost impossible to get any that would give greater satisfaction. There are two kinds of machines by the same maker, one of which self-delivers the sheaves at the side, and is supposed to be worked by two horses, whilst the other, intended to be worked by one horse, and called the "Eclipse," requires a man to deliver the sheaves at the back. Many object on that account to this machine; but, for my own part, I prefer it to the other. I shall not, however, discuss the merits or demerits of either, as they do not come within the scope of our subject to-night.

WHEAT.

Wheat, and, in fact, any kind of corn, should neither be cut nor tied up whilst wet, and it should be aisled as soon as tied. There is a difference how wheat is best aisled as regards withstanding the wind and keeping out the rain. I think the strongest way is to make the aisles round, only when they get wet, or should the wheat not be quite ripe, it takes so much longer for the wind to penetrate than it does when made the long way. I cannot say how long wheat should be allowed to remain in aisle, as it depends on the state of ripeness when cut, or the weather, and a variety of circumstances which would be different on different farms. The size of the stack should depend on the manner in which it is intended to thrash it; if by steam, then about as much as would occupy a day would, I think, be a very good size, but if required to be moved to a barn before it is thrashed, I think then a preference would be given to smaller ones, because in uncertain weather they can be moved in less time.

BARLEY.

Next in importance comes barley. It used to be the common opinion that barley should remain on the ground, after cut, long enough to have the benefit of mire dews, and turned each day; if such was now the practice, and with the seasons we have had of late years, I fancy it would get darker instead of brighter. Barley can be cut with the machine when the clover is not too high; but when such is the case, it is best cut with the scythe, as the fingers of the machine are too wide apart to cut it. Barley is not often sheared like wheat; but when it is cut by machine, I think it the cheaper and, certainly, the most expeditious way. This method is not very general in the south of England; but in the northern counties and Scotland, where harvest is later and so more liable to heavy rains, this is considered the best means to secure it. Whether either way would have any effect on the quality of the corn, I must leave to more experienced men to say. Barley should not be cut until quite ripe, or it will be streaked. It has been a very difficult matter this year to remove the hales from the barley. I question whether this is not occasioned by its being cut too soon, as no amount of rain or turning made the slightest difference.

OATS.

Oats are often cut first and stacked last, or at any time when not occupied with corn of more importance. Such being the case, it is our interest to use the best means to secure it, till such times as we are at liberty to stack it, as well as to its ultimate security. This would, I think, be best obtained by its being treated in the same way as wheat; and as clover is seldom sown with oats, the machine may here be used to the best advantage. I have said nothing about the different sorts of corn, as it has little to do with my subject; and if it had, it would be a difficult matter for one farmer to say what sort would best suit his neighbour, as the difference in the nature of the soil would preclude the adoption of the same rule on different farms.

MEANS OF CONVEYANCE—CARTS OR WAGGONS?

The securing of our corn in a fit state often depends on the means we have of conveying it with the greatest speed from the field to the homestead, or any place where we intend to stack it. And this leads me to make a few remarks, in conclusion, on the different modes employed in this and other counties of doing it. What we wish to ascertain is the most economical way of applying our horse power. We, in this and the neighbouring counties, use the waggon and two or more horses. Whether this is because it is the best, or because it is the custom, I cannot say; but, in the north of England and Scotland one-horse carts are substituted for waggons, and many practical men are in favour of the change. They certainly appear to have reason on their side, especially if they can carry, as they say they can, nearly as much on their carts with one horse as we can on our waggons with two. Our interest should lead us to avoid wasting our horse power by using implements of extravagant dimensions; and, while we are inquiring into the best means of cutting our corn, I don't think the time would be wasted if we gave a little consideration to the relative advantages of one-horse carts and waggons. A farm is not like a factory, concentrating its power at one place; but its operations are so varied and scattered, so often required at different places at the same time, that frequently we are unable to employ our labour, both horse and manual, to the best advantage.

AGRICULTURAL SCIENCE—CHEMISTRY AND MANURES.

By Mr Robert Stevenson.*

MR STEVENSON (whose paper was headed "The Progress of Agricultural Science, and the Benefits of Chemistry in determining the Nature and Commercial Value of Manures") said:—

It was not till the commencement of the present century that agricultural chemistry began to take its place as a useful science, and exert its influence to dispel much of the darkness and ignorance of former ages, and explain many of the mysteries and beauties of nature, as illustrated in the principles and laws of vegetation. The important and elaborate investigations that have been made to ascertain the composition and nutrition of plants, the action of the atmosphere, and the composition of soils, the attention that has been given to ascertain the nature, composition, and value of manures, with the interesting and important papers that have been written pointing out their mode of action and fertilizing constituents, all tend to what is most desirable—the union of practice with science. It is from the combined results of practical observation and scientific research, that just systems of husbandry can be deduced. Farmers ought to know something of chemistry, and chemists something of practical agriculture. Sloth and self-conceit are the enemies of progress, and make a man deaf to all instruction. The most hopeful symptom of our times is the restless activity to make progress and increase our boundaries of knowledge. Sir Humphrey Davy has been styled the father of agricultural chemistry. His important investigations and interesting lectures in the beginning of the present century opened up the way for other able investigators. Although he divided the vegetable constituents into organic and inorganic matter, derived from the air, water, and the soil, he demonstrates that the action of the atmosphere not only promoted those chemical combinations in the soil necessary to vegetation, but also afforded nutriment to the growing plant. Yet his views as to the form in which the food was assimilated and prepared were neither clear nor distinct, owing to the imperfect state of the science and the want of proper experiments. Liebig has the merit of being the first who laid before the public clear and practical views of the laws and principles of vegetation, and the economy of nature. He has laid the world under a deep and lasting obligation for what he has done for agriculture. The novelty of his theories, the boldness of his opinions, and the clearness with which they were put forward, created a sensation among scientific and practical agriculturists. He found that upon all soils in the most varied climates, plants invariably contain not only organic but also a certain number of mineral substances, their nature and quality being ascertained by finding the composition of the ashes; that the fertility of the soil depended on the presence and amount of these fixed and mineral substances; and that carbonic acid and ammonia are absorbed from the atmosphere by the leaves in greater quantities than what is contained in the plant. The patenting of a manure under Liebig's name, which proved very unsuccessful, led to erroneous views and mistaken opinion as to his theory. While nitrogenous manures are necessary, he considered an adequate supply of those mineral constituents which the soil could not otherwise obtain, the most essential and important. He held that water was not only a solvent but a nutritious element, indispensable to the whole process of vegetation, as rain dissolves not only a certain portion of these mineral substances, but also supplies carbonaceous

* Paper read before the Ayrshire Farmers' Club.

matter and ammonia. A shower in warm weather contains more of these than in cold or wet weather, and the first drops contain more than the last. By thunder storms, fogs, and the distillation of dew and rain, considerable quantities of these fertilizing substances are received. Spring and river water contain about four times less ammonia than rain water, from which is derived the fact that the ammonia is detained in the soil, while the pure water runs on and forms the rivers and the springs.

CARBONIC ACID AND OXYGEN.

The fertilizing influence of the atmosphere is mainly due to the carbonic acid and oxygen gas it contains. Carbonic acid is formed by the decomposition and fermentation of decaying vegetables and organic matter, and the respiration of all living creatures and animals which inspire. Oxygen, which penetrates into their lungs, combines with the carbon of their food, forms carbonic acid gas, and is thrown off from their bodies in perspiration and breathing. The air exhaled from their lungs is not wholesome, as it contains from 3 to 5 per cent. of carbonic acid, while from three to ten parts in ten thousand is the average proportion in pure air. Thus every animal during life, every fire, and every substance under decay, poisons the air by sending out portions of this deadly gas. Wind stirs the air, and is therefore beneficial by mixing it; but this is not sufficient for keeping the air pure for animal life. The plant is the great purifier of the air. As fast as animals and other carbonaceous forming agents emit the poison, the whole vegetable world absorbs and decomposes it by means of energies received from the sun. In the dark, plants are mere filters. Then their power over this gas is gone. From sun-rise to its going down they actively perform their task of retaining carbon, of which they form woody fibre, and give back oxygen to the air, so that they both purify and enrich it. The animals form carbonic acid for the use of plants, and plants give out oxygen for the use of animals. In this way are balanced the animal and vegetable kingdoms. Plants do not take in a visible quantity of food into a conspicuous aperature like the mouth of an animal, but by means of innumerable minute apertures in the extremities of the roots, furnished with a substance like a sponge, called spongiles. Plants have no stomach, but in the soil through which the radicals spread, their food undergoes a preparation analagous to that which the food of animals is subjected to in their stomach. Their leaves are furnished with a porous texture for imbibing, and tubes and cells for assimilating and absorbing the carbon acid gas from the atmosphere. Thus do we see the wise and intimate relation between animals and all living vegetables. As the water is distilled from the ocean, carried by the clouds and again deposited upon the earth as rain and dew, so those substances which all animals and living creatures breathe are stirred by the wind, carried through the atmosphere, and again deposited upon the earth as nutriment for the growing plant.

EXHAUSTION OF THE SOIL.

Soils may be considered as consisting of matter in three distinct conditions. The first may be termed the active matter of the soil, existing in a condition capable of being dissolved in water, and available for entering into the circulation of plants: these are the materials which influence the immediate fertility of the soil and regulate its productive character. The second is called the dormant matter, being insoluble in water, and therefore unfit for immediately entering into the structure of the plant; but when acted upon by the chemical agents of the atmosphere and the soil, gradually changes to a soluble condition, and assumes an active and nutritive character. The third condition is the gritty or stony portion, the type of the original rock from which all soils are produced, being the fractured particles which have withstood the atmospheric agency for a longer period, but which gradually becomes broken up into a smaller and finer state, and changes into the condition and appearance of the dormant matter. In all soils there is a progressive advancement. Should that which is stored up in an insoluble con

dition be prematurely dissolved by artificial means, and those that are carried off by the plants not be restored, the soil will ultimately become exhausted. Hence, the effect of raising crops from nitric acid and sulphate of ammonia alone, is more like living upon capital than interest, their action being more of a solvent and stimulating nature than direct food for the plant. While we pride ourselves on the increased produce we obtain, we are apt to forget that it may be at the cost of a future diminution of the crop. Should these substances be frequently applied without the application of phosphoric acid or farm-yard manure, the land will ultimately become exhausted. The air, constantly shifting, is always prepared to yield a supply of the fertilizing substances of the atmosphere, so that the exhaustion of a soil is often due to the removal of the fixed and mineral substances which it cannot otherwise obtain. Not that nitrogenous manures are unnecessary; on the contrary, if applied in moderate quantities upon some lands, they are highly beneficial. The present resources of the soil are thus developed and made available as food and nourishment for the plant, although we do not consider that new sources of food are added to the soil. The power of bones to lighten strong land by their chemical action, and thus render it less adhesive, is small. If put on to a large extent they would have some effect, but the small quantity usually applied renders this force insignificant. But they increase the productive capabilities of the soil by supplying phosphoric acid to the growing crops. As a general rule, manures containing ammonia are best adapted for soils of a cold and inert nature, bones being most beneficial upon those of a light, dry, and porous nature, which require a much larger application of mineral substances of a more firm and solid kind. The atmosphere penetrates through soils of this nature, and disintegrates the active matters contained therein.

FARM-YARD AND ARTIFICAL MANURES.

Manure is the term used to designate all vegetable and mineral ingredients which, applied to the soil, increase its productive capability, or, when exhausted by cultivation, restore its fertility. Manures act partly as food for plants, and also by their mechanical influence in assisting the operations of tillage on some soils, they frequently exert as favourable an influence as by the actual increase of the nutritive substances. Nature teaches us the course we ought to adopt, in supplying us with farm-yard manure, which must ever be the great mainstay of the farmer. The fertilizing constituents are present in dung, in states of combination which are especially favourable, not only to the luxuriant growth of our crops, but also to maintain the future fertility of the soil. It is a universal manure, because it contains all the constituents which our cultivated crops require to bring them to perfection, and is suited for every description of agricultural produce. All plants require a supply of organic and inorganic elements for promoting vegetation. Ammonia, carbon acid, and nitric acid are volatile, and are found not only in the soil, but are supplied by the atmosphere—being distinguished as the organic element of vegetation. Phosphoric acid, sulphuric acid, potash, soda, lime, magnesia, chlorine, and sillicas are all confined in quantity to the soil, being of a fixed or inorganic nature. The discovery by chemists of the substances necessary to vegetation, led to the application of artificial manures. Their nature, properties, and composition have naturally received a large amount of attention from scientific and practical agriculturists. It is not necessary that an artificial manure should contain all the constituents of the crop. This is a condition rarely, if ever, fulfilled. Those of soda, sulphuric acid, lime, and chlorine are least necessary. Potash and magnesia are more important, though not essential. Nitrogen and phosphoric acid are absolutely indispensable. The fertilizing influence of Peruvian guano is generally attributed to the ammonia, but it is equally certain that much of it is also due to the phosphates it contains —being nearly one-fourth part of the whole. A mixture of salts of ammonia and bones, to make the amount of nitrogen and phosphoric

acid equal to guano, is not so nutritious nor beneficial. Guano weighs from 68 to 70 lb. per bushel, and leaves one-third of a white ash when burned; if more than this, adulteration may be suspected. Sulphate of ammonia, when pure, is colourless, dissolves easy and with very little residue in cold water, and when heated over a lamp entirely volatile, contains about 24½ of ammonia, and from 2 to 4 of impurities. Nitrate of soda contains about 95 per cent. of the salt, and about 5 of impurities. Common salt, when sprinkled upon red hot coals, flies about with a crackling noise, but the salts of nitrate of soda do not so. Crushed bones or bone-dust may be adulterated with earthy mixtures. Their presence may be detected by mixing with water, when the lighter particles may be washed of, leaving the heavier sand and earthy matters at the bottom; or by burning a weighed portion in the air at a red heat; if the ash exceeds half the weight of bones, earthy or other matter has been added. Dissolved bones ought to be sour to the taste, and water mixed with them and allowed to stand, should become distinctly sour.

PHOSPHORIC ACID AND SUPERPHOSPHATES.

Phosphoric acid is used by agriculturists in two different states of combination. It may be used in the form of the ordinary phosphate of lime, which is insoluble in water, such as exists in bones, coprolites, &c. But there is another condition in which, by the application of an acid, it is brought into a state of division easily dissolved in water, called soluble phosphates. In bones and all other substances, phosphoric acid is in combination with lime; but sulphuric acid, with its superior attraction for lime, withdraws it from the phosphoric acid, and forms with it sulphate of lime or gypsum, and leaves the compound commonly known as biphosphate of lime, which contains only a third of the lime existing in bone earth phosphate. Some consider that sulphate of lime, which forms so large a constituent of the analysis of superphosphate, is added by the manufacturers; but his efforts are more to keep it down, as a large proportion of it excites suspicion and distrust on the part of the farmer, it being impossible to produce biphosphate of lime without also containing one-and-half times as much gypsum. As the raw materials contain also carbonate of lime —especially if coprolites—which, by the acid, is converted into sulphate, we often find a much larger amount. A point of great importance is to determine whether the soluble is always the most economical form in which phosphates can be employed. That it is often so cannot be denied. An immediate profit being important, it can never be advisable to keep artificial manures lying in the soil for a length of time unproductive. But upon lands of a light nature, the insoluble phosphates in a high state of division, such as exists in bone dust, are highly beneficial. The value of superphosphates depends upon the nature of the substances from which they are derived. Chemists are agreed that soluble phosphates are the same, from whatever source they are produced, although many practical farmers think differently, believing that those made from bones are of a higher commercial value, being more of an animal nature, and therefore existing in a different state of combination—being smaller, softer, and more porous in their particles, and more fertilizing, and sooner available for vegetation than when they are derived from coprolites. Experiments are urgently called for to determine the value of soluble phosphates derived from different sources. By using a large amount of sulphuric acid, a manure made from coprolites may yield a good per centage of soluble phosphates; but the insolubles are of little or no value to the land; owing to their hard and almost impenetrable nature, they require to remain a long time in the soil before they can be rendered soluble and available as food for the plant. All insoluble phosphates in manures derived from this source are of very little advantage to the farmer. Superphosphate should be purchased in the soluble form, and if the nature of the soil requires a part in the insoluble, mix it with bone dust, which is more easily assimilated and dissolved. Concentrated manures and various mixtures ought not to be encouraged. The

sale of manures would be much simplified if farmers would purchase the several constituents in a separate condition, and mix them together according to the nature of the soil and the crop to which they are applied. Under the present system, more depends upon the intelligence and skill of the manufacturer than the knowledge and experience of the farmer. The more simple the form in which the substances are purchased, the less liability is there to deception. A farmer who has a knowledge of the intrinsic value of manures is enabled to guard himself against imposture by the aid of chemistry in establishing a method of expressing the value of all the substances of manures, and insisting on the method of selling by analysis, accompanied with a guarantee of the substances they contain. The analysis should also contain the date of manufacture, and the signature of him by whom the analysis is made. But how few take the trouble to satisfy themselves that the manures received contain the substances guaranteed, or are commercially worth the price they were sold for. Makers of chemical manures buy the materials they use by analysis, and why should farmers be less alive to their own interest? The trouble is little and the expense nothing compared with the interests at stake. The honest manufacturer will assist and encourage the farmer to secure a genuine manure, because he knows that the result will be to his advantage. The dealer who undervalues and considers analysis unnecessary, sells a manure that will not bear investigation.

VALUE OF MANURES.

The plan pursued by chemists in the valuation of manures is simple and easily understood. All substances for the growth of plants have a definite commercial value; the quantity of each ingredient is estimated by its value, and the amount is determined by adding the whole together. No system of valuation can be made perfectly complete; for it is well known that many samples can be produced at a cheaper rate and analyse well, while others do not analyse so well but shew a better result in the field. Bones being rarely used alone, are generally mixed with bone ash, or, if a cheap manure, with coprolites and other substances. The condition of a manure is also of the highest importance. A damp and ill-reduced manure is not so valuable as a carefully manufactured article, in which the various constituents are brought into a dry and fine state of division. But chemists have been able to form a general system, which is a sufficient approximation to the relative value of these substances. Agriculture is much indebted to Professor Anderson for his many able reports and investigations, and the clear and comprehensive style of his writings and publications; and to Professor Voelcker and Messrs Gilbert and Lawes for the many experiments undertaken to ascertain the nature of manures and the laws and sources of vegetation. Experienced chemists have adopted a nearly uniform method of expressing the analysis—the different constituents being arranged under several great heads. All expressions, such as phosphate and carbonate of lime, sulphate of lime, potash, and soda, should be rejected, because in place of giving an estimate of the value of a manure, they are only calculated to mislead and confuse the purchaser. In some analysis the ammonia is not stated separately, but given as sulphate of ammonia. Now, ammonia is the substance determined, and there is no reason why it should be calculated into sulphate, which contains only about 24½ per cent. of pure ammonia. Those who are not acquainted with the terms of chemistry are apt to be deceived as to the amount. Some manufacturers seem to consider that chemists' valuations are too low, and have intimated their intention not to abide by their valuations. We consider that soluable phosphate is too high, especially if derived from coprolites, for which from £24 to £26 is sufficient value, while that of ammonia is too low. Ammonia in sulphate of ammonia costs nearly £70, but this is the dearest form in which to purchase it. Potash, though valued at £20 per ton, is seldom found in manures in sufficient quantities to exert a beneficial influence, and except in particular cases, it is not customary to take it

in. In order to ascertain whether or not a sample is genuine—without determining all the constituents—it is necessary to determine the quantity of soluble and insoluble phosphates and ammonia. The main constituents being right, it may be fairly assumed that the others will not differ materially.

CO-OPERATION.

We think the time has now arrived when meetings should be held and committees formed to consider the best and most suitable manner of purchasing manures, so as to give encouragement to the honest manufacturer, and to prevent the imposition upon farmers of worthless substances in manures. Some counties have appointed a chemist, not only to test their manures, but to teach farmers a knowledge of chemistry and scientific cultivation. Others advertise for a large quantity of manure, offers are received, the manure tested upon delivery, and then it is divided out among the members. In some places a co-operative system of manufacture of manure has been introduced. To secure a large number of members, small shares are allotted, and are taken up both by landlord and tenant, and others interested in agricultural prosperity, and the whole is intrusted to the superintendence and inspection of a large and influential committee. Co-operation has, of late, been very successful in many branches of business, and we see no reason to doubt its success in the manufacture of manure. The object of modern cultivation being to obtain from a given surface of land a greater amount of vegetation than that which is produced by Nature, requires the farmer to expend large sums for artificial manure; and his interest and success depend on the care and attention exercised in the selection and preparation of substances to impart fertility to the plant. We must be cautious not to overlook the benefit and importance of a superior tillage of the soil being necessary for the luxuriant growth of the crop; so that not only the fertilizing influences of the atmosphere may be obtained, but that the roots of plants may have a freedom of action for searching after the food they require. The liberal application of manure, and the proper cultivation of the soil, must stand side by side as valuable co-operators in the same service. Husbandry being an operation of boundless variety, extending to many objects in nature, it is exposed to more casualties than any other branch of business, involving care, troubles, and anxieties; and these are neither few nor slight.

> What bliss, what wealth did e'er the world bestow on man,
> But cares and fears attended it?

No one will insist that agriculture has reached its highest degree of perfection. Everything must be pressed into the service that skill and ingenuity can contrive to increase the products of the soil and lessen the cost of production, to meet the growing requirements of increasing trade and accumulating population. The experience and skill acquired by observation may have been sufficient for the practice of the husbandry of the last century; but the position and practice of modern agriculture demand that the farmer should be more or less acquainted with the principles and progress of the scientific as well as the practical department of his art. There are some who consider that the progress of agriculture is not in keeping with that of trade and commerce. But be it remembered that to increase their production they have only to extend their premises and increase their machinery. We cannot extend the boundaries of our farms without diminishing those of others. It is only by industry and superior cultivation that we hope to arrive at the desired end, as Providence, who rules the temperatures and the seasons, also determines the success or failure of our various operations. We feel assured that agriculture will never be found plodding on behind, but will always be in keeping with the progress and requirements of the age.

SUGAR-BEET CULTIVATION.

WE have always supported the views of scientific and practical experimenters in this country, as to the probable profitableness of the cultivation of sugar-beet, the culture of which, we are glad to say, is gradually extending. Mr Biddell, one of the largest growers of sugar-beet in England, has just given us his experience on the subject. In a letter to Mr T. W. Blyth, of Aldington, Evesham, Mr Biddell says that the growth in this country is quite equal in quality to the beet-root grown on the Continent; indeed, many have succeeded in producing sugar better than any obtainable elsewhere from sugar-beet. The cultivation of sugar-beet is decidedly an expensive operation at the off-set, as Mr Biddell shews. Taking the common charges of rent, tithe rates, horse-tilling, drilling, hand-hoeing and singling, filling, carting, and manuring, taking up and stopping, it is estimated that the price would amount to about £11, 15s. per acre; but upon the receipt side we have the tops worth, say, 7s., and the 15 tons of beet, for which £15 is paid, making the total receipt £15, 7s., thus leaving a profit of £3, 12s. Now, if we compare results with those[1] from such crops as beans and peas, and other roots, we shall find them favourable to sugar-beet. Take beans or peas, and the ordinary expenditure per acre will amount to a total cost of about £8, 13s.; and the receipts would only leave to the credit of the farmer an apparent profit of about 36s. Mangold and swedes cost about £10 per acre to grow, and he is a first-rate grazer who can make £10 of them, thus leaving the direct profit *nil.* Where mangolds can be sold off the farm at 16s. or 17s. per ton, Mr Biddell has no hesitation in saying the growing of them is more profitable than sugar-beet growing, but excepting where the farmer has easy access to London, or other large towns, he will find the demand for roots very limited and uncertain.

Mr Biddell thus sums up:—The conclusion to which I have arrived is, that where a farmer is situate within 2 miles of a sugar-beet factory it will answer his purpose to grow from one-eighth to one-fourth of his arable land in sugar-beet if he can there obtain £1 per ton for them, and have the pulp back at 12s. per ton (which will amount to about one-sixth of the weight of beet-root), and which if fed liberally with corn and cake will in a great measure replace the waste caused by selling so much produce from the farm.

THE EMPLOYMENT OF AGRICULTURAL LABOUR.

By Mr W. WARNER.*

I FEEL that the employment of the agricultural labourer requires not only our consideration, but also the serious and earnest consideration of the whole nation. Most, if not all present, are aware of the great number of able-bodied men out of employment. It has been stated as a reason for this, that the country is over-populated, that there is not sufficient employment for the population, and that the only remedy for it is emigration. My object will be to shew that the country is not over-populated, that there may be sufficient employment found for all the labour of the country, and that emigration is the last measure to which we should resort, and only then when all other means are exhausted for the employment of our labouring poor. With regard to emigration, though I would not prevent persons from emigrating, if they had the means and inclination to do so, I would deprecate any assistance being given from the country as a means of getting rid of the so-called surplus population. I look upon the labouring population as the wealth of our country, and our labourers and artizans as the strength and sinew of the nation. Neither money nor land are of use without labour, and if it can be shewn that both money and land can be made profitable by the employment of that labour, it should be our duty to keep it, if possible, in the country. There is another consideration which should influence us. Supposing we were invaded by a foreign power (and we are not unlikely to be), to whom should we look to protect us but our stout able-bodied labourers and artizans? When there was a talk of invasion in 1860, the labourers, artizans, and tradesmen came forward in greater proportion than any other classes. Experience tells us it will not do to depend altogether on our men of leisure to defend us. Now, there are many means by which employment may be found for the labourer.

* Paper read before the Botley and South Hants Farmers' Club.

GOVERNMENT EMPLOYMENT OF LABOURERS.

In the first place, it is the duty of Government to find employment, where it can be done, to the benefit of the nation and the welfare of the labourer, and I consider the Government, as stewards of the nation, are bound to make the most of the land it has in its own management; and in reference to this, I would say it is a reproach to any Government, and a scandal to the nation, to allow such a large tract of land as the New Forest, to be lying unproductive, while so many people might be employed there, to their own welfare and to the benefit of the country. I am happy to see the Government are taking some steps towards the enclosure and utilization of the land in the New Forest, and I trust they will not be deterred by any opposition from parties who, merely from sentimental or other mistaken motives, wish to keep it in its present discreditable, unprofitable, and unproductive state. I do not pretend to say in what way the enclosure and cultivation of the land should be carried out. There are more competent persons than myself to give an opinion on this point. As to spoiling the beauty of the scenery, I believe that by a judicious system of setting apart the most productive portion of the land for cultivation, and planting that of an inferior quality, with parks for recreation and pleasure parties, the beauty of the Forest would be much improved, the land increased in value, employment would be found for a great amount of labour, and at the same time a large amount of revenue would be brought to the State.

OFITABLE EMPLOYMENT OF LABOUR.

er means, by which a great amount of could be profitably employed, would enclosure of commons and waste lands closed; the breaking-up of waste and itable land enclosed in private lands, ıe drainage of enclosed lands in culti-

. 1. With regard to the enclosure of on and waste lands, not enclosed. It en stated that since 1775 there have 7,000,000 of acres of land enclosed country, the greater part of which has brought into cultivation. This has he means of employing a great amount ital and labour, and I may venture to at in hardly any instance has it been d to revert back to its original state. ortunately, there are instances where tracts of land have been allotted to ; who have allowed it to remain in its ıncultivated state, reaping no benefit elves, and inflicting a serious injury :he interests of their poorer neighbours want of employment, and causing a loss of good to the country. The en- e of land in such cases I consider an rather than a benefit, and I think it be a good law that in all future en- es a stipulation should be made by the issioners that within a given time all ɔ be enclosed should be cultivated for ɔr other crops, or be planted. This be the means of making the enclosure rofitable to the owner as to the com- ıt large. 2. There is another means ich a great amount of labour may be bly employed. There is a great quan- waste and wood land in the hands of : proprietors which is now paying ratively nothing to the owners. Now, y owner of an estate were to look around ɔperty, he would see that by judiciously ng-up some of his wood land and he would receive a greater amount of ıt for the capital so employed than : best portion of his estate. 3. An- neans of profitably employing labour draining the wet lands of the kingdom ı cultivation, but not yielding a fair amount of produce. Mr Bailey Denton, in one of his Lectures on Draining, informs us that 20,000,000 acres of land remain undrained in Great Britain, and of these about 9,000,000 of acres are clay soil. Now, I believe that those gentlemen present who have had experience of the good effects of draining will say that there is no labour so profitably employed in the land as draining; it is the first and greatest improvement, and without it it is comparatively useless to farm wet land. Tenants willing to pay five, six, and seven per cent. for draining, is a good investment for the landlord; it is good at the time of year when men most need work; and it not only increases the production of the soil, but also enhances the value of the land, converting what was before a stubborn clay into a rich friable soil, and producing as fine crops of corn and roots as any in the kingdom.

THE LAW OF ENTAIL: GAME.

Unfortunately there is a law in our country which prevents the improvement and cultivation of the soil being carried out to the greatest advantage, which is, the law of entail. Many proprietors of estates have only a life-interest in their property, and thereby have no inducement to improve it, and however much may be required to be done, it is left undone, and continued on from one owner to another, to the great injury to society, and a great loss to the country. Now, in a country like that, where the population increases 25 per cent. in every twenty years, it is quite time this pernicious law should be altered, since it operates so prejudicially to the employment of labour, and against the best interests of the nation. A great deal more labour and capital would be employed on the land if gentleman would desist from that excessive preservation of game which is carried on in many parts of the country, which is much to be deplored, and which cannot be sufficiently deprecated. The preservation of game has been the ruin of thousands; it has prevented capital from being expended on the land; it has been and is the means of many men being out of employment; it encourages poaching — an

offence which leads on to other crimes, and it also burdens our poor-rates and fills our prisons. Both public and private opinion has been expressed on the subject, but I am sorry to say (with only a few exceptions) to very little purpose. Now, it is not the wish of the tenants and those who argue against excessive preservation, or of the public generally, that gentlemen should be deprived of their sport. All that is asked for is that it be rational sport, not that foolish battue shooting where thousands are killed in one day, and where the poor birds are seen running around the legs of the keepers, little knowing the fate that awaits them; but such sport, while it affords sufficient amusement and enjoyment to the sportsman, should not be carried to that excess which operates so injuriously to the community at large. I have made the game question a part of my subject, as I consider it has a great deal to do with the employment and welfare of the labourer. I also consider it a growing evil, and if not checked, will become a curse to the country.

NECESSITY OF THE INDEPENDENCE OF FOREIGN SUPPLIES.

The population of our country is about 30,000,000. Now, according to Mr Caird's statistics, in which he is borne out by Professor Leone Levi, and other eminent agricultural writers, we only produce food for 21,000,000, leaving us deficient of food supply for 9,000,000 of our people, for which we are dependent on foreign countries. Now, if we were at war with America, or with any of the Continental countries—Russia, for instance—which may happen any day, in what state should we be? We should have corn at a famine price, and with a great number of people out of employ, it would lead to great distress, and perhaps disturbance in the country. How necessary it is, then, that we should try to make ourselves independent of foreign supply. I have endeavoured to shew how more food can be grown for the people by the employment of more labour and capital in the land. Captain Maxse, in his excellecture in our last session, told us of the enormous quantity of land not cultivated in this country, amounting to nearly 20,000,000 of acres, a great portion of which is capable of cultivation. Mr Bailey Denton has told us of the large quantity of land capable of improvement by draining, and other improvements. Now, if landowners and occupiers of land would look on this subject not only as affecting themselves, but as affecting the best interests of the country at large, they would find that we not only could grow food sufficient for our own population, but we should be keeping some £18,000,000 or £20,000,000 of money in the country, which, by circulating amongst the producer and consumer, would in the end repay any outlay incurred by the landowner and occupier. We should find that the manufacturers would be consuming our corn, we in turn consuming their manufactures, thereby making the country self-supporting, and not dependent on others. We should also—from having our labourers and mechanics employed—have less poor-rates and less county-rates, and from having less idle men we should have less criminals, as we all know that idleness and poverty are the parents of crime.

On owners of land it depends whether this country shall be a rich and prosperous country; whether employment shall be found for all living in it; whether we shall produce sufficient food for the nation, so as to be self-supporting, relying on ourselves, and independent of foreign countries; or whether we shall remain as we are, with thousands out of employment, producing food for only two-thirds of our population, and dependent on foreign countries for food for one-third of the people. I feel assured, if all landlords could realize and would endeavour to carry out this idea, they would be the means of doing a great good; they would command the respect and esteem of all around them; in benefiting others they would benefit themselves, and in reality be great benefactors to their country. They would also in this be assisted by their tenants, who, having the co-operation of their landlords, would willingly invest more capital on their farms, which is much wanted, and they would be also assisted by all around them.

here would be no distrust between landlord nd tenant, and we should then in reality, oth landlord, tenant, and labourer (to use he common saying) be found rowing in the ame boat, actuated not alone by our own ndividual interest, but by the interest of the whole community.

In conclusion, I would say, as employers we are apt sometimes, during the short days of winter, to reduce our labour, thereby throwing many men out of employ, who are obliged to come to the parish for relief. Now, I think if we were to look at it in a business light (irrespective of higher considerations), we should find that it would be more to our interest to keep them employed if possible, earning something, than to be living in idleness, earning nothing. They must not be allowed to starve, and if the employer does not bear the whole of the burden of supporting them while out of work, he does the greater portion of it. Neither should we forget that the only property the poor possess is their labour, and knowing how dependent they are on us for support, we should be only doing our duty in shewing our consideration towards them, by finding them employment throughout the winter, that they may be enabled to support their wives and families.

AGRICULTURE AND THE EARTH SYSTEM.

By Mr A. E. PERKINS.*

FARMERS are interested as members of a community in the great social question of the day—viz., the utilization of sewage; but above all are they interested in the immense waste daily going on, the enormous quantities of valuable manures which run into and pollute our rivers from every town and village, and is by this means carried out into the sea. At Newbury, the Council are obliged to turn farmers, by taking a sewage farm on which to pour the refuse of the town for fertilizing purposes. At Swindon, £8000 has just been expended for the purchase of land for a similar object, thereby securing a repetition of the Pontine Marshes, and poisoning the neighbourhood. At Marlborough, the very mention of a drainage scheme was sufficient to cause a municipal revolution. And why is this the case? For the reason, that the wrong element is dealt with to carry away the excreta and refuse from the various premises and cesspits. Water is an effective carrier; it drives everything away before it, but it simply transfers the nuisance from one spot to another, without lessening it in the slightest degree. Water promotes putrefaction, not deodorization. On the contrary, a liberal admixture of earth fixes the ammonia and renders excrement, house refuse, street-sweepings, and other things of the sort, a valuable fertilizing agent.

EARTH AS A DEODORIZER—GOOD MANURE.

The efforts of science have only proved that it is utterly impossible to effect deodorization of such a mass of sewage, unless earth is applied to the source and in detail. The application of dry earth, rendered as easy as, and much less expensive than, the water system, is one of the most valuable inventions of the day. Government reports, particularly with reference to India, the reports of surgeons to public establishments and goals, Devizes goal among the number, speak of it as a great sanitary improvement, and the private testimony of every individual I have spoken to on the subject, with any experience, is freely given, both as to the sanitary value of the closet, and the excellence of the manure for gardening purposes. But the object of this paper is to point out to agriculturists the vast field thus afforded

* Paper read before the Hungerford Farmers' Club.

them of obtaining a most essential requisite for modern farming—good manure. The isles of the Pacific are searched for their guano, brought home at an enormous expense, the very mummy pits of Egypt are despoiled of the ashes of the dead, and yet innumerable thousands of tons of manure, which, when earth is properly applied, is as "odourless and clean as guano, and about half as strong again," are daily worse than wasted, poisoning the fresh air, polluting wells and streams, and producing sickness and death. The earth manure has only to lie under cover for five or six weeks, in a shed or any sheltered place, and having during this period been occasionally turned over, it will be inodorous, dry, and fit for use as manure. If the earth manure be not drilled in, care should be taken to use it during rainy weather, otherwise the valuable salts contained in it are subject to waste. The process of deodorization by earth has been tried since 1866 on Baron Rothschild's estate at Halton. In the earth sheds there may be seen excrementitious matter, on its first removal from the closets, and in barrels, dried and ready for the corn and turnip drills. In all its stages it is perfectly inodorous, even when subjected to the fiercest summer heat, and it may be handled with the utmost impunity.

EXPERIMENTS WITH EARTH MANURE.

Interesting experiments have been recently carried on on this estate. In the course of a letter I lately received from the Rev. H. Moule, he says:—"I may add that the estimate of Mr James has since been raised. Mr James estimates the value after one use at £4; after two uses at £8; and an experiment of the following kind was tried by him and his two agricultural friends in the park of Baron Rothschild. Five strips of land were marked out, the first highly manured with stable dung; the second with earth which had passed once through the closets; the third with that which had passed twice; the fourth, thrice; and the fifth, four times. The effect of the several kinds was traceable to an inch. The stable dung the least effective; the earth used four times the most effective. Of course, much must always depend on the care and exactness with which the earth is applied. And it is this which, in my opinion, adds so much to the increase in value on the repeated use of the same earth." An experiment was made, in 1869, with fifty-seven grains of Hallet's Pedigree barley. These grains were sowed, on Jan. 6, by Mr Moule in a pot of common earth, and the fifty-seven plants produced by them were transplanted into a patch of ground rather less than 1-5th of a rod or perch. Into each hole (ten inches deep) was poured 1 ounce of the earth, which had passed through the closet four times. The sparrows destroyed fifteen of the fifty-seven plants, but by a subsequent division of the stronger plants, the number was raised to fifty, occupying 1-5th of a rod or perch. The smallest of these produced fifteen stalks, and the larger forty to forty-five stalks, with ears measuring 6 to 7 inches in length, and in some of them forty or even forty-four grains were counted. The whole produced half-a-peck, equivalent to *twenty-five sacks per acre*, and a weight of eight and a-half score to each sack.

VALUE OF EARTH MANURE.

Then, again, I know you all take the greatest interest in the labourers beneath you. Now, if you can teach them to apply earth to their closets, you would at once get rid of a nuisance which is most productive of low fevers, and supply them with a wonderful means of improving their gardens by applying the manure formed in this manner; and other refuse, which usually forms a stagnant heap, to the plant or crop; to the crop or root of the plant rather than to the ground. The deodorization may be effected by the rough-and-ready application of a shovelful of dry garden earth, and the manure might be removed in a wheelbarrow, and applied to the plant or crop. A store of dry earth can be secured by a few wheelbarrows full of earth being wheeled under cover in the dry summer weather. It can be used a second, third, or fourth time, after being dried, the value being considerably increased by each usage.

THE PRESERVATION OF MEAT.

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Jones claims to have arrived
ich is almost perfect, which, he says, makes the meat more nutritive and palatable than when it is cooked in the ordinary manner fresh from the Metropolitan Meat Market. The conclusions of a paper, read by Mr Jones before the Society of Arts, will be found in our last publication (page 186). Since then, he has been "interviewed" by the Food Committee of the Society of Arts, and gave a more succinct view of his process. He said:—"We put the meat into tins, either with or without bone, in joints, or otherwise. The tins are filled quite full, and are soldered up entirely, with the exception of a small tube, about the size of a quill, which is soldered into the top of the tin. The tins are then put into a bath capable of holding ninety-six 6 lb. tins. Along the centre of the bath runs a tube, carrying twelve taps, into each of which may be inserted a tube from eight tins, there being eight stuffing-boxes to each tap, four on each side. The tube communicates with a vacuum chamber. The bath contains a solution of chloride of calcium, which boils at a temperature of from 270 deg. to 280 deg. In commencing operations, the bath is gradually heated, until it gets to about 212 deg. Communication is then opened with the vacuum chamber, and the result is, that as water boils at about 100 deg., *in vacuo*, the water is carried off in the shape of steam into the vacuum chamber, where it is condensed. The tap is then turned, so as to shut off communication with the vacuum chamber, and the meat is then cooked at a high temperature, until complete preservation is effected. We then go on cooking the meat, occasionally turning the taps, just to do what engineers call priming, in order to draw off any fluid that may be in the tins. After it has been thus cooking for about two hours at 250 deg., it is in a preserved state."

In the course of his examination by the various members of the Committee, it came out that what he wished was, that the Com-

mittee should believe that he could preserve his meat in shorter time, conserve the colour and the flavour better, and that it was not necessary that the bones should be taken out. The meat, he admitted, was rather overcooked at present, but when the cook became more accustomed to the work, there would be no fault to be found, even upon this score.

The Committee did not bind itself to the sanction of Mr Jones' scheme, as they rightly waited for more evidence. One of the members, however, declared, and there was no dissentient, that the "*rationale* of the process seemed excellent." We should like the Committee, at an early date, to give the weight of their unbiassed authority as to the best system; the subject being, as we have said, one of very great interest alike to the stock-owner and the eater of meat.

SHORTHORNS IN AMERICA.

FROM the recently issued number of Mr John Thornton's *Shorthorn Circular*, we extract the first part of a very interesting account of what the author saw of shorthorns in America, during a tour through the States last winter:—

Before the present century dawned, some of our best shorthorn cattle were imported into America; since that early period, both the States and Canada have bestowed great attention on their breeding, and no countries have made so many importations or paid such large sums for good animals of the most fashionable blood. A history of American shorthorns is now being compiled by Mr Lewis F. Allen, the editor of the "American Herd Book," therefore, my purpose in the following paper is to give merely a sketch of those herds that I saw in a short trip of nine weeks, during which time only several of the leading herds in the States and Canada could be seen, and many good and well-known stocks were passed by, with regret, unseen. Shorthorn breeders, ere this, have been able to form their own judgment upon the cattle that have, since 1861, been sent back into this country, and their offspring have, by their own merit, shewn that the blood has suffered little, if any, degeneracy, even under a change of climate and on different soil and food. Many difficulties present themselves in writing a short narrative of a winter journey. I shall, consequently, endeavour to set down only such things as came before an impartial eye-witness, for, if I mistake not, the public, hitherto, has never received any account of American shorthorns in their native homesteads and pastures. Winter is not the season for cattle to shew to the greatest advantage, but if animals look well at such a time, due allowance can be made for their appearance under more favourable circumstances. It has been generally considered that the American climate is against the growth of hair. The majority of those animals I saw, especially the younger ones, shewed as much hair as may be seen in many herds in this country. Nature and fashion, however, adjust themselves to circumstances. The summers in many parts of America are exceedingly hot, hence, nature throws off that coat which is a protection against the cold in winter, and at the shows, those animals attract the most notice that are sleek and as well groomed as a horse; consequently, in summer, the cattle are well brushed, sheeted against the heat and flies, and not exhibited with that coat of hair so much admired here.

Few strains of blood have created, of past years, more attention than that of the Duchess tribe; the scarcity and demand for it in this country led to its re-importation from America, where, consequently, it has drawn forth as much or even more notice. Although Duchess 34th, generally admitted to be one of the finest of the tribe, was offered by Mr Bates, in 1835 (whilst in calf, with Duke of Northumberland (1940), by Belvedere), to the Ohio Company for 150 guineas, she was not purchased, and the first exportation of Duchesses was made by Mr Thorne from Earl Ducie's sale in 1853. A period of depression in America ensued afterwards, and it is considered that Thorndale, Duchess County, New York, situated in a cold

lly district, near the Hudson River, in its ficiency of limestone, was unfitted for the owth and development of shorthorns. Mr horne sold most of his herd to Mr Sheldon, hose estate at White Springs Farm, Geneva, in a good grass region, has a fine wheat soil, nd is thoroughly adapted for cattle. Here ie tribe increased, but domestic circumstances d to the sale of Mr Sheldon's herd to Messrs Valcott & Campbell, of New York Mills, Utica, here this branch of the tribe is at present ocated. There are (December 1870) ten cows nd heifers, varying from two to ten years old, wo heifer calves, one three-year-old bull, and our bull calves; but all these cows and heifers re not in a breeding state. There is at the resent time great demand for the *pure* pedi- ree; the word pure is here used technically, nd is intended to convey the blood of the suc- essive bulls used on the family since the death f Mr Bates in 1850. It may further interest he uninitiated breeder to know that, after Mr Bates obtained the tribe in 1810, he used Ketton 2d (710), whose dam was by a grandson f Favourite (252), out of a cow by J. Brown's Red Bull, then a *pure* bull; The Earl (646), bred from the Duchess tribe, who in his turn was succeeded by three bulls, of different strains—viz., Second Hubback (1423), of the Red Rose tribe, Belvedere (1706), of the Princess tribe, and Norfolk (2377), bred by Mr Whitaker, from Nonpareil, with the blood of North Star, Punch, and Hubback; and these three bulls, be it remembered, were all of Robert Colling's best blood. The Cleveland Lad (3407), a bull with three crosses, now generally known as the Oxford cross, was intro- duced a few years before Mr Bates' death, and t is only this cross now that is admitted as *pure*. Since the tribe has been in America, ome of the animals have been kept *pure*, and he blood of the others has been intermingled with three different families—viz., the Booth blood, through Third Duke of Thorndale (17749) and Third Duke of Airdrie (23717); he Knightley blood, through Imperial Duke (18083); and the Burghley, or Romeo (13619), blood, through Second Duke of Geneva (23752). It is considered that the Booth and the Knight- ley crosses are failures, because being very closely or strongly bred tribes, with a fixed type, they disturbed the strong current of the Duchess blood, but Romeo was looked upon as being rather a loosely bred bull, so he therefore seems to have invigorated the tribe without disturbing their good qualities. Romeo was first used with the Oxfords, and produced a very fine cow, whose son, Oxford Lad (24713), was the sire of Third Duchess of Geneva, the dam of Second Duke of Geneva (23752). This strain occurs also in Messrs Leney's Seventh Duchess of Geneva, and Mr M'Intosh's Third Duke of Geneva (23753), re-imported and sold at Windsor in 1867. It may be possible that this blood being introduced in an indirect and diluted form, was more beneficial than the others introduced more directly.

The few still *pure* do not attract additional notice. One of the handsomest Duchesses (Tenth Duchess of Geneva) in the New York Mills herd, was by Second Duke of Geneva, who was used by Mr Edwin G. Bedford, an old established breeder in Kentucky, where there are several of his offspring. The bull's skull is still retained, and Mr Bedford affirmed that it was the skull of the finest bull he ever saw. The chief merit, however, in the American Duchesses, appears to be in their production of bulls, which, when used in other herds, produce a fine quality of stock. The cows themselves were stylish looking and large, in one or two cases almost approaching coarseness; the chest deep but often narrow, causing the fore-legs to stand somewhat closely together, the ribs well sprung and round, with great space from them to the hips, and great length of quarters, which had the effect of lightening the thighs. But they possessed that fine head and sweetly-curved face for which the tribe is distinguished. The eyes were singularly bright and prominent, but this was noticeable in the majority of American cattle. The calves were being excellently managed—each had a good dairy cow as nurse, and they shewed much vigour and wonderfully good coats of long hair. Fourth Duke of Geneva, the sire in use, was a fine noble-looking bull, having several good points, a deep red in colour, and with rather harsh hair.

The Oxfords, at New York Mills, comprised ten cows and heifers, only one *pure*, a hopeless breeder; two aged bulls, Baron of Oxford (23371), fifteen years old, and Royal Duke of Oxford, twelve years old, both pure; three year- lings and two bull calves. Mr Sheldon disposed of two of his best Oxford heifers to Col. King, of Minneapolis (who has since re-sold them to Mr Cochrane), before the entire herd was sold. One of Messrs Walcott & Campbell's heifers, with the Marquis of Carabas (11789) cross, was a very good yearling, and Gem of Oxford, by Second Grand Duke (12961), from Oxford, by Romeo (13619), a good cow, rather small, but of

excellent quality, and very full of rich roan hair. The two aged bulls were still in use. This tribe is considered in the States to be slightly coarse, but improved by the Duke crosses. The herd at New York Mills was first started with Rosamond, imported from Mr Mason Hopper's herd, and descended from the May Rose or Georgiana (by Fitz-Remus) tribe. There were several of this family, one of which, Rosamond 7th, beat the recently imported prize heifers, Baron Oxford's Beauty and Charming Rose, in the two-year-old class at the New York State Fair, 1870; although a good animal in high condition, she lacked length and elegance.

There were several good descendants of Mr Wetherell's Roan Duchess (the Blanche tribe), and of Mr Holmes' Victoria (Mason's No. 1), the latter with excellent fore-quarters. The herd also contained some of Col. Towneley's Barmpton Roses, some Gwynnes, and Js. There were two or three fine animals of the Mazurka family, a very favourite strain in America, which will be mentioned hereafter. The herd was well managed, and the cattle housed in large, airy, commodious houses; being seen inside them, they appeared somewhat to a disadvantage, and, although a good lot, apparently wanted uniformity of character. The farm is large, and one portion near the river Mohawk is very fine pasture land. Good hay, hardly so full of herbage as in England, is grown and stored in lofts over the cow houses, very little cake is given, and shorts (fine bran), with a little corn (maize) meal, is the principal food.

Two years ago, the British public was astonished at Mr Cochrane's purchase of Duchess 97th for 1000 guineas from Captain Gunter; last year he bought two more Duchess heifers, besides a very large number of the best animals that could be obtained throughout the country. In 1867, prior to the purchase of Duchess 97th, his agent, Mr Simon Beattie, selected and bought Lady Pigot's prize heifer, Rosedale, at the Duke of Montrose's sale, and the bull Baron Booth of Lancaster from Mr Barclay of Keavil. These two animals were exhibited at various agricultural shows (called State Fairs) in Canada and the United States, and carried everything before them. Indeed it was difficult to keep the crowd from them, as these shows are much more numerously attended than at home, and are held on the same ground year by year, the sheds or boxes, with a large covered amphitheatre for judging, remaining fixed. As they were said to be of Booth blood, the attention of breeders was more drawn to them, and a demand for the strain arose. This led to further importations and last year nearly forty animals were sent ou in one vessel, most of them at high prices. A few of these animals have been sold, but th larger and better portion has been kept fc breeding; so that the herd, numbering about hundred head, is looked upon as one of the be and finest stocks in the country.

With most of these animals, several of the being our Royal prize winners, the public pretty well acquainted; the short time th have left England has not altered their chara ter; indeed in several instances they seemed have improved.

Mr Cochrane's farm at Compton, Province Quebec, is situated in a comparatively nc country; the rough timber fences traili snake-like across the fields, tree stumps stan ing 2 feet high, the slight wooden houses a three-storied farm buildings, the water troug of hollowed logs, present a striking contrast one accustomed to Old England. Wh clover and Timothy grass grow luxuriantly summer, and make good hay; capital turni are also grown. These are pulped, mixed wi chaff, and, with the addition of cake and mix meals, make an excellent food when the cat are housed. The face of the country is gen ally white with snow for at least four months the year, and the thermometer often marks degrees below zero; yet the cattle thrive (ceedingly, and do well; the calves suck th dams, or a nurse, and pick a little hay or m as soon as they will, consequently they are good condition, and have long coats of h One bull calf, by Fourteenth Duke of Tho dale, from Duchess 97th, of great substance a with abundance of deep red hair, was parti larly promising. The two Duchess heifers h improved since they were shipped last ye each having produced fine healthy heifer calv and the cattle generally shewed the gr attention and excellent management that v bestowed upon them.

Eleventh Duke of Thorndale, purchased 1867, by Sixth Duke of Thorndale, own sis to Duchess 71st, was in service. He is a 1 animal, red, with the distinctive white spots the forehead and flanks, and of great depth a substance. Mr Booth's Royal Commanc also in use, had grown into a very handso yearling.

One large wooden house, built on a sto foundation, contained thirty-two cow stalls, a thirty boxes on the ground floor, with places turnips, pulping, and mixing. Two inclir

to an entrance at the side of the
on the second floor, which contained
ght heifers and a large number of bull-
ver this, the hay and straw were
The sheep were also housed, but had
run in as well. These houses were
an, comfortable, and well ventilated;
mals were turned out twice a-day to
appeared in as good condition and
naged as at home.

during a severe gale, cattle crossing
tic usually stand the voyage well,
ir food only for a day or two after
ut in a storm their bellowing seems to
eir fright and suffering. One of the
last year met with a heavy gale, some of the animals burst from the strong boxes that had been put up between decks for them, and getting much bruised, took a long time to recover. A handsome mare broke from her box, and was so cut and knocked about by the rolling of the vessel, that she was obliged to be thrown overboard. It is found that cows and heifers usually travel better in calf, and if warmly housed a few days before going on board, do better on the voyage. With judicious and careful feeding, they keep up their condition well, and when unshipped, often, by their antics, appear to shew their joy at landing. Few know the sufferings of sea life, and the risk and anxiety occasioned by the transport of valuable stock.

The Garden.

CULTIVATION OF HARDY ANNUALS.

BY the term Annual, when applied to plants, is understood such as bloom, ripen their seeds, and die or finish their existence the same season as that in which they are sown. In this country they are divided into two classes—half hardy and hardy. The first requires to be sown in hot-beds under glass, and to be protected until the season is sufficiently warm to plant them in the open border; the latter may be sown in the open air, and do not need any protection. It is of their cultivation that we propose to speak.

They want a moderately rich, friable soil, finely pulverized. Only well-rotted manure should be applied; strong, coarse manure has a tendency to make them grow very rank, and to develop foliage with few flowers.

The time for sowing them is from the middle of April until the beginning of June, much depending on the character of the season. If the spring is wet and cold, the sowing should be deferred until the ground is well warmed by the heat of the sun, and is in a comparatively dry state. In ordinary seasons, from the 1st of May to the 1st of June will be most suitable. As the seeds are generally very small and the plants quite delicate, if sown during a spell of fine weather, they will vegetate immediately; but should the weather be cold and wet, the young plants are liable to become stunted, and are sometimes killed.

With the ground as fine as possible, small circular furrows, from 3 to 8 inches in diameter, should be made with the finger or with a pointed stick, in proper places in the flower-border. These furrows should be of a depth proportionate to the size of the seeds. Lupins, Marvel of Peru, sweet peas, and seeds of that size, require a furrow about ¾ of an inch in depth; balsams, zinnias, and such like, about ½ an inch in depth, and mignonette, China asters, and seeds of similar size, should not be over ¼ of an inch in depth: while antirrhinum, and seeds of very small size, should not be covered over 1-8th of an inch. The seeds should be sown very thinly; if three to five come up and flourish, they will be sufficiently close. After sowing and covering, gently press down the soil with the back of the hand, or with a piece of board, which will do it more evenly. If the weather is very dry, the earth should be gently watered through the fine rose of a water-pot. The seeds may be shaded by a piece of paper or muslin laid over them, with the corners held down by small stones or clods of earth; this will prevent the ground from becoming baked, and will keep it moderately moist. The paper or muslin should be raised every day to see whether the seeds have vegetated and pierced through the soil, in which case the covering must be immediately removed.

When the seeds are up and in the second or third leaf, they may be transplanted if desired. Most species can be transplanted; yet poppies, and other tap-rooted annuals, are better left where sown. Remove them carefully with a trowel, and, after transplanting, water freely.

The following selection comprises some of the best and most easily grown species:—

Alyssum maritimum, or *Sweet Alyssum*, very fragrant little annual, about 6 or 8 inches high, with white flowers; blooms all summer.

Amaranthus melancholicus ruber, with blood red foliage, and *Amaranthus tricolor*, with

ured foliage of red, green, and
e both desirable ornamental foliage

hinum, or *Snap Dragon*. Of this
two kinds—the large and the dwarf;
ese, again, there are many varieties,
g white, yellow, orange, red, crim-
let, and striped varieties. The
ts grow about 1 foot high; the large
ut 2 feet high.

or *China Aster*. Of this there are
ieties, some of them very curious.
1 be had of numerous shades of
owing about 18 inches high.

s.—Of these the camellia-flowered
rose-flowered are good, both very
d perfect in form, of many colours,
ing about 2 feet high.

ia aurea, with yellow flowers of a
lustre, about 1½ inch in diameter;
eet high.

odorata, or *Candytuft*. Of these
the white, purple, crimson, and
red varieties. Height, 1 foot.

nthus macrosiphon, with rose-coloured
nd also white, and flesh-coloured
Height, 1 foot.

pulchella grandiflora: deep rose-
lso a white variety, and a double-
variety, which is very pretty. There
, such as *Clarkia integripetala*, and
es, which are very fine. Height, 18

vulus minor: of which there are
ieties, one being double flowered.
all trailers and very showy. Height
12 inches.

nium, or *Larkspur*. All the species
r are showy and valuable as border
specially D. Ajacis and consolida,
hich are universally grown among
r annuals. They grow from 1 to 2

us Heddewigii and *Dianthus laci-*
oth varieties of the Chinese pink,
beautiful, the flowers being mottled
maroon, crimson, rose, and black.
foot.

bia variegata. A plant with pretty variegated white and green foliage. Height, 2 feet.

Eschscholtzia californica, and its varieties, have very showy, beautiful flowers, of various shades of yellow; one variety has white flowers. They grow from 6 to 12 inches high.

Linum grandiflorum coccineum, and the white variety of the same, are very desirable plants. Height, 1 foot.

Machæranthera tanacetifolia, a very pretty plant of the Everlasting tribe; with purplish flowers and a yellow centre. Height, 1 foot.

Mirabilis Jalapa, *Marvel of Peru*, a very showy, well-known plant. Of this there are many varieties, some of the newer of which are very fine. Height, 18 inches.

Petunia phœnicea, in its many varieties, is almost indispensable in a garden where annuals are grown. The double varieties are much esteemed, although we do not admire them as much as the single varieties. Grows about 18 inches high.

Phlox Drummondii. This is one of the best annuals; it continues in bloom nearly all summer, and the flowers are very beautiful and of rich colours. There are some ten or twelve varieties; but these, as in the case of nearly all the annuals, sporting into varieties, can be bought in mixture. Height, about 6 or 8 inches.

Portulacca, of different species and varieties, is a very brilliant flowered annual, trailing on the ground, or not over 3 or 4 inches high. There are red, white, yellow, orange, purple, scarlet, and double varieties; the latter are very beautiful.

Perilla Nankinensis is an ornamental foliaged plant, with deep, mulberry-coloured leaves, which is very effective when used in contrast with other plants of various-coloured foliage. Height, about 18 inches.

Reseda odorata, or *Mignonette*, a well-known fragrant flower; no garden is complete without it. Height, 6 inches.

Tagetes signata pumila is a very pretty plant of the marigold family; the flowers are yellow, with brown stripes; it is a very profuse bloomer, and when grown as a single

specimen, forms a perfect hemispherical tuft of beauty, about 1 foot high.

Tropæolum nanum, or *Dwarf Nasturtium*. The many fine varieties of this plant are all more or less desirable; they are very showy and effective. From 6 to 12 inches in height.

Zinnia elegans. The double varieties of this plant are very desirable, rivalling the dahlia in beauty of form; in colours of yellow, crimson, purple, scarlet, and orange. Height, 18 inches to 2 feet.

In purchasing seeds it is always best to buy of seedsmen of established reputation, and not to buy the seeds generally sold in small country shops, as but little dependence can be placed upon the class of seeds sold in this way, and no responsibility attaches to the seller. Many of our seedsmen make a speciality of flower seeds, and issue catalogues which contain a great deal of interesting and instructive matter relative to floriculture of this class.—*Alpha.*

NEXT SEASON'S FLOWER GARDEN.

[The greater portion of the following paper was written by Mr Fish, to be published in September last. A pressure of matter at that time prevented this. Now we give it with additional seasonable particulars, supplied by the Author, in the hope that our readers may profit by its lessons—ED.]

MODE OF TAKING AND ROOTING CUTTINGS IN SPRING AND AUTUMN.

"WHERE is it? What a startling question! Dear-a-me! who wants to hear anything about next season's gardening, while so earnestly, happily enjoying this? Sufficient to the day is the good as well as the evil thereof. Next season's flower garden, indeed! What's the use of troubling about that now? Who cares to go peering so far into the future? No, no, let us enjoy this season's garden. It never was so beautiful before. To enjoy it is alike the duty and the pleasure of the hour. What a luxury to sit on that seat, or lounge in yonder arbour, and let that abounding beauty please, satisfy, lull you to soft luxurious ease and quiet repose. The year's garden is at least a great success, and doubtless the next will be like unto, or better than it."

Thus reasons the lethargic gardener, and tries to soothe himself into inaction by opiates. But it won't do.

The question returns with increased urgency, "Where is next season's flower-garden? Where! indeed?" Shade of sunset! answer. There it is, waving in the sunlight, or clasping and covering the earth with a sheen of glory. Certainly it must be reaped from the glowing surface of this garden. If it remains where it is much longer, it may be lost. "Time and tide wait for no man." To these two may now be added—trains and tender plants with hard frost at their heels. Frost, indeed! Talk of frost; when one has to ice their butter, to prevent it running into our mouths in unbidden streams of yellow liquor.

And yet, let me see where we are. This is the first of September. The fields of golden grain are bending down to meet the reaper; partridges are hiding to-day in the stubbles; the earth seems getting ready for the cold. I have seen the frost put its sharp sickle into tender plants in October or even earlier. It takes cuttings a month or six weeks to root. Six weeks carry us forward into the middle of October. Before that time comes—next year's plants ought to be rooted, hardened, established, housed. There is not a moment to lose. Next year's flower-garden must be instantly detached from the tops or sides of this year's garden. As yet they have no separate existence; the sooner a separation is effected the better for next year's flower-garden. The two must no longer continue

t become two. It does seem a pity to touch plants and flowers of such perfuty. It is hardly possible to meddle so

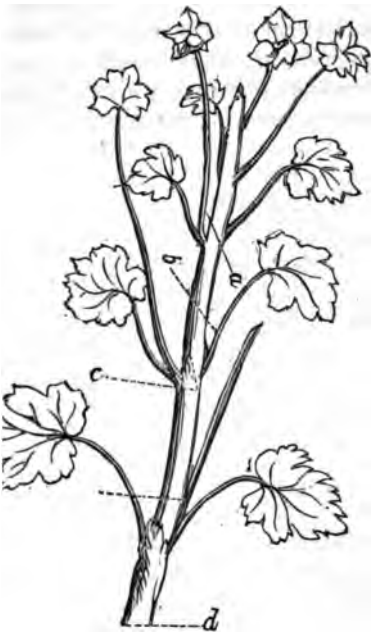


Fig. 1.

as is needed to secure a sufficiency of gs without, at the same time, marring. were our stock of plants larger, and our more ample, we should decline to run

2.

Fig. 3.

sk. No flower-bed nor border should poverished for next season's supply of . A reserve garden should be set apart

to provide for increase only. Next year's recruits would then be drawn from the reserve force, not draughted from the plants on active duty. But, unfortunately, it is seldom possible thus to provide for cuttings. In most gardens every plant is, as it were, engaged in active service. The entire stock is too small for the enormous demands made upon it. It therefore follows that the garden of one season must furnish plants for the succeeding one. The plants have to discharge two functions, perform double duty, furnish the present, and provide a succession for the future. No sooner have the plants filled their allotted spaces, and exhibited their full beauty, than we are down upon them with exorbitant demands for stock for next year. These seem rather hard measures. Our excuse for it is the tyrant's plea—Necessity. We must have next year's garden furnished out of this. But in providing for the future we should see that the present is injured as little as possible. If our plants must be topped and beheaded, the knife may at least be handled skilfully and tenderly.

AUTUMN CUTTINGS.

To provide stock we must meddle much; but we need mar but little. The first act of providing plants for next season's flower-garden consists in injuring this year's display as little as possible. It is astonishing how generally this art is forgotten or ignored; the results of nine or ten months previous care is often recklessly destroyed in fewer minutes because cuttings are wanted. Autumn beauty is ruthlessly sacrificed in a ruthless raid on the beds. A certain man wants cuttings of scarlet geranium, say. He goes to a bed of glowing beauty and slashes it down, as a reaper would a sheaf of wheat, carrying off his cuttings in armfuls of long boughs glowing with blossom. Another wants exactly the same number; he comes, basket and sharp knife in hand, he handles the plants carefully, removing the lower growths, and such side-shoots as are not likely to blossom, and gets, say, seventy cuttings. He wants thirty more, and how does he proceed

to get these? He must cut down some of the leading shoots. Every one of them is studded with flowers, and bristling with flower buds. (See fig. 1.) Now, if this cutting is cut through at *d*, there is an end of its flowering for this season. If at *c*, the old flowers will continue to bloom for a few weeks longer. If it is cut off in a slanting direction, at *b*, one flower bud will be left on the point of the shoot. Now, if still higher, at *a*, two buds will be left, and it will continue to flower as if the top of the shoot had not been converted into a cutting. It is not always possible to get cuttings long enough without removing flower buds with them. Neither is it necessary to leave every bud. The very late ones would not have time to expand into blossoms, and it may be safely affirmed that if one unopened bud is left on the extremity of every beheaded shoot, there will be no lack of bloom while the season lasts. It will be observed that the upper lines are shewn slanted. The cut is made in this direction, to save the flower-stems, and yet secure the opposite leaf as a base for the cutting, and in practice I have found these slanted cuttings to root and keep just as well as others. The slanted portion of the cutting is cut square across under the leaf before it is inserted. Fig. 2 shews the cutting sloped off. Fig. 3, the same cutting, with a portion of the splintered portion removed to the level of the leaf. Of course it takes more time to collect the cuttings in this careful manner. But surely two or three months' extension of autumnal beauty is cheaply purchased by a little extra expenditure of time in the collecting of cuttings. No effort is spared to provide for early blooming while it often seems as if late flowers were not worth perpetuating. We ought to curtail the flowerless period at both ends of the season, and, as far as may be, abridge it altogether. Few things will contribute more to this most desirable end than the careful removal of the cuttings from pelargoniums and all other flower garden plants. The same rules apply to all, though not perhaps with so much force. The habits of such plants as petunias, ageratums, calceolarias, verbenas, come to our aid in saving the leading shoots from destruction. If we want good cuttings, the main shoots on which the flowers are chiefly placed should never be used. These are apt to perish in winter, and never make plants equal to the side branchlets that break in pairs from every eye of the main shoots. These should be cut off with a sharp knife from 1 to 3 inches long. This is done by removing the cutting with an atom

Fig. 4.

Fig. 5.

of the main stem, and the large leaf at its base attached to it. Fig. 4 shews a branch of petunia with two lateral shoots or cuttings at *a*; fig. 5 shews one of these heeled or splintered off; fig. 6 the same cutting with the splintered end cut off square at the base of the leaf; fig. 7 another cutting of lesser size. I prefer retaining the large leaf if placed in a close atmosphere, it acts at once to cause a movement of new matter toward the base of the cutting, and hence to form roots. But cuttings will root as freely, though not so soon, without the leaf. If the leaf is retained, it must be nourished in a genial atmosphere; if allowed to wither, it is more likely to drain the cutting dry than to nourish it.

Fig. 6.

Fig. 7.

Close cold pits, frames, handlights, or protectors, shaded for several hours during the hottest parts of the day, are the best places for all such cuttings as I am now writing about. As soon as they are rooted, harden them gradually, until they will endure

air, night and day, and until frost ıes. They must then receive the f glass. Where room is scarce, and have been drained with at least 1 is safer) of broken pots, bricks, or —stones are too cold—cuttings will ll in these store-pots, as they are ill the following spring. The soil ɔe a sandy loam—that is, loam two d sand one, with one-sixth of an inch ıand on the top of the pot.

ɡoniums of all kinds should be lifferently. Either top or side shoots, to 6 inches long, may be chosen. ght across at a leaf, or pair of leaves, ıt out either in the open ground, or ɔr boxes, in the manner you would in cabbage or cauliflower plants. em right in the sun, and water, &c., f they were already rooted. Under l treatment, nineteen out of twenty : freely. Those rooted in the open nust be potted up as soon as rooted.

Fig. 9.

Fig. 10.

laced in pots, pans, or boxes may be n them for the winter. It matters nothing whether the base-leaf is left ɾgonium cuttings or not. I seldom ıing but cut the stem straight across, ble in the cuttings. In dry weather the leaves will dry up. In remov- ɑ, care must be taken not to dis- : cutting. When they are inserted, ace of the ground is watered down into uniform smoothness. This consolidates the cuttings, and excludes the air; no more water is given, until the surface is again dry. I prefer pelargonium cuttings with a growing top. They root soonest, and are so far the best. They are also the safest to winter; that is, if they are not too soft and watery. In that case, the top often decays, and drops, as in fig. 8, in which the top of the shoot is bent over through decay, and a line of decomposition is shewn running down the side of the cutting, as shewn by the dark mark *a*. The chances are that this will ruin the cutting. If, however, the cutting can maintain itself, as in fig. 5, such unbeheaded cuttings have a better chance of standing over than the beheaded ones (figs. 8, 9, and 10), in which the heavy black lines indicate the progress of decay through the centre, from summit to base, which too often happens. There can be no doubt that cuttings with growing tops are the safest. This is also one reason why the lateral, or side shoots of petunias, &c., are so much better than pieces of the main stem. The growing ends are left intact, and, as in a close atmosphere, with perspiration checked, these move on at once without roots—the movement this growth of top helps, probably forces, the formation of roots. On the contrary, headless cuttings remain inactive for some time. Dormant or semi-dormant buds have to be pushed out before roots are formed. Now, the danger of losing cuttings from not rooting is increased by the time that elapses between their insertion and their rooting. All cuttings without roots are in special danger of dying. As soon as rooted they are plants, and then life is safe. Hence, everything that abridges the time of rooting is of importance. Growing tops tend to this result; therefore they form the best cuttings. Roots can hardly be formed without a movement of fluids in the upper portion of the cutting. The leaves on the bark send down the organizable matter that forms roots. It is therefore most important to keep the leaves in a state of activity. Two opposite courses, it will be observed, are prescribed for cuttings of different kinds. For such plants as petu-

nias, verbenas, &c., a close atmosphere and partial shade, in fact no flagging, must be allowed. For pelargoniums, the open air, full sunlight, and, almost certainly as a consequence of these conditions, considerable flagging; and yet, singular though it may seem, these opposite regimens have the same effect on the cuttings. Each results in a motion of fluids. In the stems and the leaves of verbenas, &c., the movement proceeds from the additions of fluids from the outside. Pelargoniums have semi-succulent stems, containing an excess of fluid likely to end in the rottenness of a stagnant cutting. Hence it is placed in such circumstances as shall draw off some of this excess, and this exhaustive process ensures an internal circulation of fluids that favours the emission of roots.

It must never be forgotten that solidity of base is of immense importance in the rooting of most cuttings. Light and air must be excluded, and the earth should be so firm as to allow the new roots to get a grip of it at once. No cutting is tight enough in the ground if it can be pulled up after insertion by a portion of the leaf without the latter tearing. This is a safe, old, and simple rule, that every gardener may apply to his own work.

I need hardly add that for propagation by cuttings, every pot, pan, or box used should be scrupulously clean. Cleanliness is not only the parent of health, but an aid to rooting. No plant, far less any cutting, should ever have to contend with dirt. Clean cuttings are even more essential than clean pots and sweet soil. No mildew, thrip, spider, aphis, or caterpillar-infected branch, should ever be used to make a cutting of. For want of attention to these points, such pests are often handed over from one season as a legacy to the next.

As to soil, the simpler it is the better. Choice cuttings which are to be stored in the same pots through the winter might have a handful of sweet, well-rotted, hot-bed dung to feed upon, just over the drainage; above that, two parts of loam with one of sand is the best compost; then from a-sixth to a-quarter of inch of sand as a surfacing. Cuttings that are to be potted afresh as soon as rooted will root as well, or better, in pure sand than anything else; they need no food but such as the air and water can provide until they are rooted, and therefore it is quite a mistake to put cuttings in rich earth. Thorough drainage is the most essential point. Stagnant water at their base means death to most cuttings, and must be prevented. Many cuttings need much water, but they refuse to drink it all, and quickly become masses of rottenness if they are compelled to stand in it by imperfect drainage.

SPRING CUTTINGS.

A good many plants have often to be propagated at this season. Some varieties of bedding plants again do best and flower longest from spring-struck plants. Verbenas, petunias, ageratums, alternantheras, &c., may be reckoned among them. Pelargoniums, upon the whole, do best from autumn-rooted cuttings. But even these root freely and rapidly in the spring; and the stocks may be doubled or trebled after February. The mode of procedure is somewhat different, although our save-bloom-system of taking cuttings is as useful to the gardener now as in the autumn, for any bit of blossom is indeed a treasure in glass house or pit at this early and comparatively flowerless season. But, of course, rooting out of doors is out of the question. Even the glass house will be almost too open and airy for the rooting of spring cuttings of pelargoniums. These are much more soft and tender than the autumnal ones. A place in a pit or frame, with a temperature of 60 deg., will root them rapidly. Little water will be needed till they are rooted, which will be in a fortnight, or three weeks. A small house at the above temperature would be even more suitable. But if the cuttings have been wintered in a dormant state, they will root very well in the glass house, though they may be double the time.

Verbenas, &c., should be excited into growth before the cuttings are taken, and then only the tops of the tender growth should be used as recommended and illustrated for autumn propagation. These will bear a high tem-

rature, and a moist atmosphere. From 65 g. to 70 deg. suits them well, and roots e cuttings rapidly, that is, in from 6 to 10 ys. Dahlia shoots and young growths of lvia patens, or other plants, require similar nditions to root them with despatch. ring propagation is like travelling by ex- :ss, autumnal by the parliamentary train. e principles of both are alike, the summer's lthy strong-rooted plants the same, but speed is different, and there is no waiting at rooting stations by spring-struck cuttings. Rooted to-day they should be potted off to-morrow, grown on rapidly, hardened off warily, and rest not day nor night for a single moment till they have filled their summer's quarters with beauty, and feel the keen edge of the knife of the cultivator once more amongst them, amid the real glories and bounding joys of harvest tide in search of more cuttings for yet another season's flower garden.—*D. T. Fish, F.R.H.S.*

GLASS HOUSES.

BEFORE touching upon the subject of glass houses, about which so much been written of late, I trust a few pre- ry remarks may not prove uninteresting our readers; hoping, however, that they not come home too closely to them- es. Some time since I was staying at house of a lady in this neighbourhood, informed me she had heard that many trees had been destroyed by the frost, ıg me, at the same time, to look at her . The gardener was summoned, and xamined the peaches and nectarines on ıth wall, and came to the conclusion, as : was no appearance of shrivelling or :ness on any of the shoots, that no ıge was done; they looked, in fact, in ct health. On my return home I ex- ed, and came to the same conclusion t my own trees. A few days since ıg occasion to speak to my gardener, was pruning the spurs of a Marie se pear tree on a south wall near the ɛ, I remarked that the fruit buds looked :er than I liked, and begged him to cut with his knife. This was black and bitten all down the centre of the bud, :he same was the case not only with all ɔuds we examined, but with the inner of the shoots themselves (the epidermis, ieve it is called), this being also black evidently destroyed by frost. We immediately adjourned the inquest to the lower garden, and found, upon stripping the bark off the apparently healthy-looking shoots, that all the peaches, nectarines, and other fruit trees on a south wall were in the same plight. The trees on this wall are young trees just coming into full bearing, their predecessors having been destroyed by the severe frost of 1860, and I sadly fear that the showers of April will be sprinkled only in vain over the dying and the dead.

Having introduced a new system of growing fruit and flowers under glass, which has been eminently successful, as being peculiarly adapted to places where one really good house is required, capable (as the late Mr Veitch said of the new house at Chiswick, built upon the principle) of doing an "immensity of work." This principle consists of a house constructed in such a manner that fruit trees and flowers, or both, as the case may be, can be removed from the house into the open air with the greatest care, by means of trucks upon a railway. Managed with only common judgment, it enables grapes to be grown in the house in perfection, which could not otherwise be done without injury to the fruit or flowers, which require to be exposed to the air more frequently.

Your valuable space will not allow me to do more than touch upon the subject, but I

would with pleasure send a pamphlet explaining the whole process, *in extenso*, to any gentleman desirous of building, who likes to apply to me. I may add that I am not an advocate for the very cheap glass sheds in vogue a few years since, many of them already requiring new tops and new bottoms. They are certainly not adapted to the beautiful villas to be seen in every direction in this country. Such places require a good substantial vinery at a moderate cost, but such a one as will contain all the appliances for growing fruit and flowers in the greatest perfection. Mr Barron, the Superintendent of the Royal Horticultural Gardens, informed me (as the result of the first year's trial at Chiswick) that there was no question about the superiority of the flavour of the fruit over that grown in all the other houses in the garden, and that the flowers also fully answered his expectations. I have no doubt but that he would extend his accustomed courtesy to any inquirer, by giving him such information as he might wish for on the subject. The builder of the houses is enabled to construct them very cheaply, as all the parts are made by machinery, and they are laid up in quantities in store to season, being all cut to a pattern. He has also made some improvements upon the Chiswick house, and, as far as I can judge, brought them to as great perfection as can possibly be attained for the combination of purposes for which they are built. — *Rev. John Fountaine, Southacre Rectory, Brandon.*

MOVEABLE DRILL.

THIS is a very handy implement for general purposes. Any gardener using it for sowing seeds in drills can make them much more expeditiously than under the old method of using a draw-hoe alongside of the garden-

Moveable Drill.

line. The saving of time in all operations is a matter of the utmost moment. It is a desideratum which is more and more studied the longer we live, and adds to the facility of the extension of business. All the shifting of the line from one breadth to another is done away, and the time at disposal economized in proceeding with important work. Given one straight line and this tool, unless in slovenly or very inexperienced hands, will keep all the others straight, until the quarter of ground is drilled. All plants, however, do not require the same width when full grown, therefore it may be said the driller is only good for such seeds as require the width of space to which the tines of the driller is set. The manufacturer of the implement, which is illustrated, has foreseen this difficulty, if difficulty it might be called, and provided for it, as may be seen on examination, by making the frame with a slide so as to adjust the tines to any width of from 10 to 15 inches. This is exactly what is required in the garden during the sowing season, and we therefore have pleasure in recommending such a tool to all gardeners who have much drilling to do.

MISCELLANEOUS TOOLS FOR KITCHEN GARDENS.

ENERAL activity ought to prevail during this month. We have very ntly referred to the propriety of being

Garden Spade, Fork, Rake, and Hoe.

adiness to take advantage of every rable blink of March weather for sowing purposes. The tools that ought to form the *vade mecum* when such weather comes, are represented in the figure. The spade, the fork, the rake, and the hoe are always in request during the months of spring. The first, of course, is the implement for digging; the second, that for distributing manure; the third is, two implements combined in one, to do the drill-drawing or earth-stirring operations, and to put the proper finish on the quarter of ground when seeds are duly deposited. It might, probably, be fully as convenient for all gardeners, for all the additional expense, to have the rake and the hoe independently; but whether or not, both are in absolute request at the time, and for the purpose specified. They are the quartette among tools that are best known, and our apology for naming them, if apology be needed, is in the necessity of drawing general attention to having them in readiness. The parts of them that are used, either in the ground or among the manure, ought to be bright and clean, not coated either with rust or with earth, as, in such a condition, general operations are greatly impeded, and often only imperfectly done.

GARDEN DIBBLE.

OWEVER simple this little wooden article may be, it is exceedingly useful ch work as potato planting, where the e is used instead of the spade. Indis-riate dibbling is bad, because there is a possibility of the sets being dropped in at unequal depths, and an unequal show or braird :quently takes place. When, how-the party planting uses such a dibble as that which is engraved, uniform planting must take place. The cross piece of wood prevents the dibbler going beyond a certain depth, and if he makes it touch the ground at every insertion, the operation is conducted throughout properly. Of course the dibble must be always of a greater diameter than the sets to be planted, else some will be caught between the earthy walls and cannot reach the bottom. A due observance to such small details at the proper time, often spares much vexation or annoyance afterwards.

Garden Dibble.

Work in the Garden during April.

From "THE VILLA GARDENER."

APRIL already! It seems impossible! It looks like but yesterday since we took pen in hand to guide a new host of readers into the mysteries, simplicities, and pleasures of gardening. And now we have travelled together all round the year, along the crowded highway of THE VILLA GARDENER'S pages. To me the journey has been pleasant; may I hope that it has been equally so—and profitable, as pleasant—to your readers; and may the future be better than the past, is my New Year's wish to every reader. Personally, I could have wished a plebiscite of our constituents concerning this department in the future. Their approval would have made prospective duties lighter; a censure would have cut the matter short by instant resignation. But this could not very readily be taken, and so the Editor has decided for both writer and readers for another year. I confess I have a dread of it, lest our second year's work should be marvellously like many of the Psalms of David in the old Scotch metrical version, "Another of the same." In these, however, there are variations in the metre and arrangement of the sentiments. So far, at least, I will copy the illustrious example of these versifiers, who did some of the sublime Hebrew melodies into extraordinary rhyme and almost equally mysterious sense. The Work of the Month for 1871 will be similar work, necessarily, to that prescribed for 1870, with variations. I will endeavour, however, not to sacrifice sense to variety, but to pack both into smaller compass. With this intent the introductions will be cut short, and the WORK OF THE MONTH become more of a recital of what to do, than formal lessons of how to do it. Information will be freely given of the reasons why, and the manner how, in answer to correspondents, or in special articles when required. Besides, it is assumed that the readers of THE VILLA GARDENER have learned something—it may be much—during the past year. Hence our teaching will not be quite so elementary. Infants in gardening must turn back to the first volume. We must advance with our pupils or they may outrun us. Still, while promising this much, we shall continue to give simple instructions in this department suitable for villa readers. We may as well take another leaf out of the book of the old rhymesters, turning our matter topsy-turvy, making our last first, and first last. Trusting your readers will approve of these changes, I now introduce them to the Vinery, Orchard House, Glass House, Pits, Frames, Flower, Fruit, and Kitchen Garden, in the order here written. In walking through a garden we often cull a new pleasure, and see objects in a fresh light, by reversing the usual order of our walk. I hope such may be the experience of our readers in regard to our monthly doings. May every reader find more instruction, and reap a fuller harvest of pleasure, from the villa this year, than the last! Our bitterest enemies—supposing we have any—can hardly have considered us April fools on our first venture, and, doubtless, it is the aim of every one on the staff of THE VILLA GARDENER to make it a wiser, better, and more welcome guide to every reader the second year than the first. Our object, even in these commonplace aids to gardening, is not servilely to copy, but substantially to improve upon the past.

THE VINERY.

Started last month, the Vines will now be making rapid headway, and root-way likewise. The latter, if near to the surface, which they ought to be, should have been protected from the piercing winds and penetrating frosts of March, with a layer of dry litter of some kind, or a few mats, a piece of canvas, or an old wooden shutter—anything to keep the ground from being frozen. Vines, and other fruit trees, with their heads in a temperature of say 56 deg. or 60 deg., which the Vines ought now to have, and their roots exposed to frost, are like a lady sitting in a warm drawing-room with her feet, were that possible, in the open air. The nearer the temperature of the roots and the tops correspond, the better for the health of the plants. We may readily approximate to this equality of temperature by keeping the surface covered with litter during the night, and removing it during sunny days to let the sun in to warm the border. As soon as the sun ceases to hit the border, scatter the litter back. This is just as effectual in keeping it warm, and as reasonable as our putting on a greatcoat when we leave the fireside for the open air. The covering should remain on the border throughout the month. Of course, if the borders are inside the house no covering will be needed. Inside borders should have a thorough watering about once in the course of the month. By the term thorough, I do not mean any given amount, but a sufficiency to pass right through the entire border. Outside borders will need no water this month. The Vines will now be shewing fruit, and the all-important work of disbudding and stopping the fruiting shoots must be attended to.

E ORCHARD HOUSE.

l flower early this month. The chief of us is to give air freely, admit the ıde the frost and cutting draughts of likewise needful to beware of an ex- ıd moisture. If the weather should ontinue dull throughout the flowering :he house as dry as possible—floors, ees; the roots, however, must be tered. Give abundance of air all day. ɔerature down to 55 deg. or 60 deg., hut up the house about four o'clock, ide a reservoir of heat to maintain a ɔerature of 40 deg. or 45 deg. during the

THE GLASS HOUSE.

lass house bearable, and preserve the urity of the flowers by a very slight course it must not be used to ex- possible, only to plants in blossom, king their young and tender growth, ellias and Azaleas, immediately after uch plants as Pelargoniums coming hould not be shaded. On the con- ght to be placed near the glass, care- ıt, and as soon as the flower buds are ed to become strong by being watered, eek, with house sewage, manure-water, ɛeping cow, sheep, or pigeon's dung in ', and putting about a pint of this mix- llon of clear water. Guano water, an ın, or some of the advertised manures, also dead leaf should be removed, or rather lie; and if a fly appears, smoke the plant ɔag, or fill the house at once. Water as the days lengthen and the sun It is good practice to look through e about noon, and examine every plant ıgging. It may be dry, for the sun may ul for its leaves. If the former, water in until it revives. If the latter, shade eshness. During hot days, and it some- hot in April, the floor, stages, shelves, : sprinkled with water two or three times, e air, and check the drain of fluid from . branches. All this is the more neces- ants are fresh potted during the month, f cuttings are being rooted in the glass

led plants, such as Heaths, Epacrises, , are often shifted during the month. d a sixth-part of sharp silver sand is the all hard-wooded plants, and villa gar- shift on only one size at a time. If the sixties, move them into forty-eights; if nto thirty-twos, and so on. Before pot- the entire ball of the plant, that is, all earth are moist. Drain the new pot; tangle the old roots, especially at the bottom, removing the old drainage, or crocks, so called. Place a little of the roughest soil over 1 inch or 1½ inch of drainage. Make it firm. Then place the plant in its new pot, the top of its ball, or roots, being from 1 inch to 1½ inch, or 2 inches, under the rim, and fill up the space between the old ball and the new pot firmly with fresh soil. Water the plants at once to help the new and the old soil to fraternize into a perfect amalgamation, and the great mystery of successful potting is accomplished. We must refer the reader to our first volume, page 66, for further particulars of the art and mystery of potting. Give air freely, without exposing the plants to draughts. Maintain a minimum temperature of 40 deg. or 45 deg., allowing a rise of 10 deg. or 15 deg. with the sun. If you wish to ruin the plants, and destroy all bloom as speedily as possible, you have only to allow artificial and sun heat to raise your house 20 deg., without giving air or shading, and it is done.

PITS AND FRAMES.

These structures are likely to be chokeful of bedding plants, seedlings of all kinds, cuttings of every available sort, and other stuff, undergoing a process of transition from the glass house to the open garden. Others will have Radishes, Carrots, Potatoes, Cucumbers, in such structures. And perhaps more villa gardeners devote their pits or frames to florists' flowers, such as choice Auriculas, Carnations, Cloves, Pinks, Polyanthuses, and Heartsease. The purposes for which they are used seem to give us a rough classification of such structures, which it may be needful to observe in the Work for the Month.

We shall write of them as hot or cold pits, &c. Of course there are also intermediate ones, such as those devoted to the growth of Radishes, Potatoes, &c., but we shall not retain the three-fold distinction.

Hot Pits.—Raise and prick off flower seeds, Celery plants, and grow Cucumbers and Melons. Strike Verbenas, Dahlias, Ageratums, Petunias, Pelargoniums, Heliotropes, &c. Keep a moist-growing temperature of 66 deg. to 70 deg. Cover carefully at night, and give a little air at the back of the pit only during the day.

Cold Pits.—Water Potatoes and Radishes with tepid water. Give abundance of air, drawing the lights right off in fine weather. Plant out established bedding plants in rich soil, to be moved with balls into the flower garden, and place them here to harden off. Grow herbaceous Calceolarias for flowering in pots. Plant out Carnations, Pinks, Hollyhocks, Heartsease, wintered here into the open ground in beds or borders. Shade Auriculas, and tilt up the lights all round, to allow a free current of air. Sow seeds of Heartsease, Pinks, Carnations. Shade late Hyacinths coming into bloom, and exclude frost.

THE FLOWER GARDEN.

This, if partly planted in the mixed style, which is that adopted in most villa gardens, and, indeed, ought

to be in all, or furnished with Crocuses, Tulips, Hyacinths, Anemones, and early flowering herbaceous plants and annuals, will now be a scene of cheerful beauty. Flowers are never so beautiful nor so welcome as in the early spring. No glare of gaudy colouring in the autumn can compensate for the absence of the simple Violet, Primrose, Daisy, Polyanthus, common border Auriculas, and other simple children of the spring. With these bursting everywhere into beauty, the garden will be most interesting. The month, likewise, brings work as well as pleasure. Turf should be swept, rolled, and mown; gravel turned, hoed and raked, or fresh surfaced, and then firmly pressed down for the season. Box and other edgings laid or trimmed; borders hoed and raked, amid flowering plants or bulbs; the turf sides of walks and beds, fresh edged with the edging knife, or clipped, and everything be made to look dressy and clean, to welcome the flowers, and add to our enjoyment of them. Such plants as Phloxes, Asters, Golden Rods, &c., should also be reduced by division of the shoots or roots, and thus multiplied and kept within bounds. Hollyhocks should be planted in rich deep soil at the backs of borders, or in the centre of beds, and hardy annuals sown, either on a reserve bit of ground, or where they are intended to flower.

Roses.—Finish pruning early in the month, cutting the weak growers back to two or three eyes or ends, while strong shoots may be left a foot or more. After pruning, top-dress with a coating of the richest manure that can be found, or saturate the beds with house sewage or liquid manure. The Rose is a gross feeder, and can hardly have a surfeit of such matters. The roots delight in partially decomposed cow, or pig, or sheep dung. That of horses is not strong enough to their taste. I have heard of a lady calling in a gardener to consult about her Roses. They would not grow, and the gardener was asked what he would put under them. "Cow dung!" And around them—at the sides? "Cow dung!" And over them. Still "cow dung!" And the receipe proved most successful. Give Roses the richest, strongest, deepest piece of ground in the flower garden, and don't worry their roots with any surface crop of flowers. The end of this month, or the beginning of the next, is the best time to plant Tea Roses. These make charming bushes, while their fragrance is beyond compare. Attend carefully to providing a sufficient number of plants or good size, and sufficiently hardened off for furnishing vacant spaces in flower borders, or the beds devoted to so-called bedding plants.

THE FRUIT GARDEN.

Complete all pruning and training of tender fruit trees. Protect the blossoms from the frost, and on scorching days from the glare of the sun where practicable. Frosty nights and bright days are the most trying ordeals for wall trees in blossom. Alternately crippled by cold, and half scorched up and drained dry of their nourishing juices by the fierce glare of the sun, many blossoms wither up and die. There is a great excess of heat on the southern face of opaque walls, which glass walls will remedy, by simply sending the excess through to the northern, or cold side.

Disbudding may be proceeded with towards the end of the month. If the weather is cold, defer till next month. The young shoots and their growing leaves form a capital protection to the tender fruit at their base. During the early stages of growth such shootlets take but little strength from the tree, while they perform the double duty of sheltering the fruit and exciting the roots into full activity. See that birds, especially chaffinches and tomtits, do not feast on the fruit buds of wall trees; and keep a sharp look out for green fly, and syringe with tobacco water or quassia tea, or a solution of Gishurst's compound, as soon as it appears. Also destroy ants before they have time to establish themselves. We have no greater pests among choice fruits.

Complete the grafting of any trees that could not be done last month.

Mulch and water late-planted trees, dashing the water overhead on mild evenings. This is of much more service to the tree, by checking evaporation from its bark, and nourishing its bursting buds, than the application of moisture to its wounded roots, which they are unable to drink up or imbibe.

Top dress or make new plantations of Strawberries. The same high feeding that was commended for Roses will just suit this fruit. It may almost be affirmed that the richer the food given, the larger and more luscious the fruit gathered.

THE KITCHEN GARDEN.

Plant Potatoes, Cabbages, Cauliflower, Lettuces, Broad Beans, Kidney Beans, Winter Onions, Herbs.

Sow the main crops of Brocoli, Brussell Sprouts, Savoy, Kale, variegated Cauliflower, and Cottager's Kale. Also the main crops of Carrots, a few Beet for salading. Sow also Lettuce, Endive, Celery, Radish, Vegetable Marrow, Ridge Cucumber, and a liberal breadth of Peas. Also, twice during the month, a few Turnips and a pinch of Summer Spinach.

Celery, sown in pots early, should now be pricked out and pushed on, either under Protector, Cloches, or Hand-lights, which can now be removed from Cauliflower, Lettuce, Early Peas, &c.

Cauliflower will be much improved if they can be earthed up with a mulching of rich manure, placed in the form of a cup, with the stem for its centre. This cup to be filled full once a-week, at least, with rich manure water.

Herbs, such as Summer Savory, Knotted Marjoram, Sweet Basil, Chervil, &c., should now, where inserted, be sown, also Mustard and Cress, in a sheltered, partially shaded corner, or in boxes, pots, or pans, every week. Nothing can exceed this as a relish to bread and butter in the spring. Sow very thick, and cut as soon as the first proper leaves begin to shew

es. Such greens quicken the appetite, pro-
estion, and cool the blood. Amid all other
and plantings do not forget Canary Creeper
Nasturtiums. They are admirable as creepers
or wall, and the latter are as useful as orna-
The flowers are better than mustard and
bread and butter, and the almost ripe seeds
pers as a sauce to boiled mutton.
: or replant, if necessary, such herbs as Mint,
Fennel, Sage, Tarragon, Marjoram, Penny-
:.
the hoe going among growing crops. Stake
d wage war against birds, mice, rats, snails,
ır other vermin that take French leave, at
this early season, to help themselves to your tender greens. Cats are the best antidotes to the first, second, and third; and a shower of dust composed of equal parts of soot and hot lime, on a mild morning, will speedily clear the garden of the fourth. One dose scorches, the second stupefies, the third generally kills, and the fourth is a preventive measure to hinder any rising from the dead, or coming from distant quarters. Never allow a weed to get beyond the seed leaf. Destroy it as soon as seen. The work of destruction is then easy. To allow it to grow large and roll the ground before its removal, is to lock the stable after the steed is stolen, with a vengeance.

Arboriculture.

YUCCAS FOR VILLA GARDENS.

PERHAPS no class of hardy plants deserves more encouragement than the various species of Yucca, or Adam's Needle, as they are generally designated. Their oriental character gives them a preference in cultivation over many other hardy perennial favourites. There are several interesting species now grown in the British gardens that may be recommended—viz., Yucca gloriosa, Y. recurva, Y. superba, Y. flaccida, and Y. filamentosa. Notwithstanding the stately habits of these plants, it is surprising to find them so scarce in many of the nursery establishments throughout the country. The Yucca is a plant of easy propagation, as will afterwards be explained, and advantage should be taken of this circumstance to have them more generally diffused. The Yucca gloriosa is the variety most frequently cultivated in the Scottish gardens, and is, perhaps, the hardiest of all the species, but, with a few exceptional cases, rarely seen together to any extent. The Yucca succeeds best in a rich loamy soil, and, when in flower, amply repays any trouble taken to bring it to maturity. A good flowering spike, independent of its leafy stem, often attains the height of 4 or 5 feet, and measures from 3 to 4 feet in circumference, each spike producing several hundred blooms of a tulip shape, and cream coloured. After flowering, the stems of the large varieties generally divide into two or more leaders, and, if well cared for, a succession of flower spikes will, in time, be produced from them, the strongest stem flowering first. An idea is prevalent amongst some cultivators that the leaves of these plants must be tied up during the winter months to prevent them being injured by snow; but this practice is often very detrimental to the health of the plants, as it blanches the young leaves, besides breaking them at the base during the process of tying, and renders them more susceptible of injury after they come to be let down. They are always hardier and more healthy coloured when left alone; and although a few of the lower leaves may become injured by the wind, still these can be cut off during the spring months, and the plants will soon regain their proper shape.

I have stated that in the Scottish gardens, the variety most commonly grown is the Yucca gloriosa; but in Ireland, and more particularly in the neighbourhood of Dublin, the Yucca recurva appears to be most prevalent, and it is, without exception, the most graceful of the tribe. The effect of this variety in Merrion Square, Dublin, is quite remarkable. Their prevalence in that locality is due to the energetic efforts of Mr Adair, who has done much to extend the cultivation of many new and half hardy plants in Ireland. Although the Yucca superba and Y. recurva are most abundant in the neighbourhood of London, yet a large proportion of Yucca gloriosa is also to be met with, while the Yucca flaccida and Y. filamentosa are very common both in the London gardens and throughout the country, both species being frequently found under the same name. The two latter are dwarf-growing varieties, as well as very free flowering, and hence well suited for cultivation in villa gardens. Other varieties are to be found in collections, as also several variegated forms, but none of them so general as those previously mentioned.

The Yucca may be considered by many as rather stiff and formal in habit, but a method of growing them, which tends to take off the stiff appearance, while it preserves their ori-

aracter and outline, has recently been here. This method is to grow them d stone compartments, or in rustic umps, as we call them. These rustic are formed of 6 or 8 elongated pieces of freestone, about 2 to 3 n thickness, inserted into the ground exagonal or octagonal shape, and ; from 18 to 24 inches above the varying according to the size of nt to be placed in the centre so Each corner is furnished with

Fig. 1.—Yucca gloriosa.

triangular pieces of freestone, of uniform size, placed at the joinings ı upright stone, like a series of but- . The stones are generally inserted ı foot into the ground, and the internal filled with good rough soil, in which ccas are to be planted.

desirable that the soil should be made considerably below the base of the so as to induce the roots to go down. be found that the roots of the Yucca eely to the stone, and will soon penetrate to the soil below. The stone stump for the cultivation of Yuccas, as represented in fig. 1, is intended to stand on extensive rock works, or grass lawns. Their effect on grass lawns is considerably improved by having them raised on circular rockwork mounds, standing 2 or 3 feet above the surface. This raised portion should be formed into rockwork compartments, and filled with dwarf Alpines, or with such plants as sedums, sempervivums and saxifrages, the spaces between the buttresses being admirably adapted for them.

I have already stated that the Yucca is a plant of easy propagation, provided you have a good plant to begin with. If a large plant is lifted out of the ground, it will be found that the root portion is studded with numerous elongated fleshy tubers (fig. 2), varying from 3 to 5 inches in circumference. All the exposed ones may be removed from the thickened root extremities, without the least injury either to them or the parent plant. The specimen, after being denuded of its root buds, can be again planted in good soil, or placed in one of the stone stump compartments, where it will go on thriving as if nothing had been done to it. It is not, however, necessary that the plant should be taken out of the ground for the purpose of removing these fleshy tubers. It can be done by simply baring the roots on opposite sides, and cutting the tubers off with a knife. These fleshy root buds, after their removal from the plant, can be potted and placed in a gentle heat, keeping the apex a little above the soil, when they will soon develop a healthy crown from the extremity, also rootlets from the sides. After the tops have pushed a few inches, they should be removed into a cold pit or frame, and afterwards planted out in open-air beds, where they will soon mature themselves.

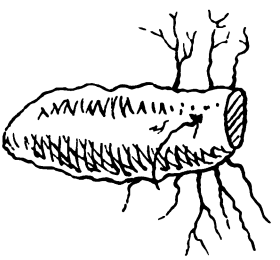


Fig. 2.—Tubers of Yucca.

Another method of propagating the Yucca is by sections of the stem. When a plant branches, which is by the effects of flowering, or by an injury, one of the branches may be cut off, and its stem cut into transverse sections, from 1 inch to 1½ in thickness, and partially dried on the cut surfaces, by placing them upright in an airy position. They must afterwards be laid on the floor of a hot propagating pit, which has been previously covered with a layer of soil, over which a covering of sand has been placed, and afterwards kept partially moist. In a few weeks it will be found that the dormant bud round the cut section will swell and finally push out into young growths, and roots will protrude from the lower side, as represented in fig. 3, which will penetrate the sand into the soil. After a few months the central portion of the section will decay, and the young plants will be left independent. When this takes place, they can be put round the inner surface edge of pots in good soil, where they will soon come forward, and, when strong enough, may be planted out in open-air beds.

Fig. 3.
Mode of Propagating Yuccas.

The stems of the Yuccas are formed by the decaying leaves annually falling, or, what is more frequently the case, being pulled off. At the base of each fallen leaf, on the stem, will be found a scar; on the edge of each scar a slight swelling is observable, which, when detached, will develop into a young plant. On a free-grown stem, a section 1 inch thick will generally contain two dormant buds, and one ½ an inch thicker will have about three buds. When cut thicker, more buds may be given out, but they are not so easily handled as those produced from the thinner slices. While in very old, slow-grown stems, the scars are much closer together; and although the dormant buds are numerous, many of them never come forward. The development of these scars will not take place on the plant so long as the top remains; but if the top happens to be removed, it will be found that several of the scars nearest the upper end will develop into shoots. The superfluous ones can be removed and treated as cuttings: they will soon root, and form independent plants.

Another method of propagating the Yucca is by cutting the stem sections into pieces 12 or 18 inches long, and laying them in a bed of moist sphagnum moss or soil in a warm pit; and, owing to the fleshy nature of the stem, the strongest of the dormant buds will soon develop themselves. When these are of sufficient strength to be removed, they can be made into cuttings by taking a portion of the old stem along with the cutting; others will come forward in succession; and this will go on as long as the stem possesses substance enough to produce them.

When an old plant is furnished with numerous branches, it is easy to remove any of them in a state fit to grow, merely by cutting a notch about ½ an inch deep round four-fifths of the stem. After the cut becomes a little dry by exposure to the air, roll a quantity of damp moss round it, keeping it both above and below the notch. The under edges of the upper portion will soon callus over, and roots will be produced into the moss. When the roots are sufficiently strong, the stem may be cut on each side a little below the ½-inch notch. In time, the top may be cut off and inserted either into a pot or in the ground.

In this country, so far as I am aware, the Yucca has never been known to produce seeds, although seed is not unfrequently sent over from the southern States of America; but whether produced by climate, or by insect agency, I am unable to answer. Suffice it to say, that seedlings, when procured, take a very long time coming forward, compared with the various methods of propagation here given. This is one of the not unfrequent cases in which a plant does not produce seed, but where nature has provided other means of propagating and extending the species.—*James M'Nab, Royal Botanic Garden, Edinburgh.*

The Stable.

*SUPPLY OF ENGLISH CAVALRY HORSES.**

By Mr EDMUND TATTERSALL.

RY one will admit that there is no better judge of horses in the kingdom Edmund Tattersall. More horses of er and finer sort have passed through over which he presides, or under his , than have been knocked down by all ctioneers in the kingdom. This gentle- given us his ideas as to the best kind rupeds to be supplied to the English under present circumstances. This the first time that he had ventilated s. He had long noticed that a well- imal carrying a light weight, and along at full speed, could easily over- heavy horse penalized by a "man n" on its back. "I know of one ," he says, "in which a mare of mine, rwards beat the Arabs, met a bigger full gallop, knocked him backwards, ped over him and his rider." And r of this theory of light well-bred and riders being superior to heavy men on the most powerful of horses, ttersall expresses the belief "that Blue Gown or Siderolite, Fordham Saw, Johnny Daley on Restitution, rench on Kingcraft, Custance on an, Chaloner on Blair Athol, or w on Gladiateur, charging at full gainst an equal number of Truman nbury's men on dray horses, would best of it. "I should," says Mr ll, "back the light division." Passing e—what shall we say—somewhat s parallel drawn between his light favourites and the heavy opponents in human and horse flesh alike—the trained men on equine blue-bloods against unskilled riders bestriding plebeian horses, there cannot be a doubt that there is much wisdom in Mr Tattersall's advice to those in authority, as the war just over has proved. The Uhlans were the men who, above all others, distinguished themselves in the Franco-Prussian war, and they were light riders upon light and well-bred horses. These are the sort which Mr Tattersall recommended in a letter to the daily papers six months ago—"active, useful, short-legged, sound hackney mares" —a class which we have been selling to other countries, greatly to our own detriment, to be put to thorough-bred horses. These are the kind of horses that Government should encourage, the hero of Albert Gate says. We should have Government studs in this country, as they have in foreign countries, private persons not being able to manufacture such animals in such numbers as to pay. And while we have, as a rule, no great fancy for a paternal Government, or anything approaching it, we do believe that much money would have been saved to this country if, in the wars in which we have been engaged within the last twenty years, we had had a supply of the horses which Mr Tattersall desiderates. The following paper, which was an elaboration of his letter, will be read with great interest:—

Mr Tattersall said—We have the best breed of horses in the world, sought after by all other countries, and yet our cavalry are badly mounted, and are not what they ought

* read before the Farmers' Club, London.

to be. And for all this, who is to blame? Why, the people at large—you amongst the rest, who ought to speak out, through your Members in Parliament and through the Press, and let those know who pretend to manage our affairs, that above all things we will have an effective army, ample guns, artillery of the best, with horses of the best class to draw them, without which they are useless; and cavalry horses of the highest class to mount our cavalry upon, with ample reserves, which, in cavalry, is most important; for though you may buy horses in haste for draught horses, you cannot make a horse a broke charger under a year or two, any more than you can a good cavalry soldier to ride him. Let us then have no more cheeseparing Chancellors of Exchequer; they do not pay, in the long run, any more than other cheap articles. Let us have the best horses at any cost; it is the cheapest in the end, and all the money is spent among the farmers and breeders who pay the Queen's taxes.

LACK OF HORSES—PRICES GIVEN BY FOREIGNERS.

At the present moment, under sudden pressure, we require a much larger number of cavalry and artillery horses than usual. As the late Lord Herbert said, we are always vibrating between parsimony and panic. Just now we are somewhat in the latter stage —in other words, we are not prepared. We want 4000 horses; 2000 of them for the artillery, for which £40 each will be given. These they may get, but there will be much difficulty in getting the other 2000 for the cavalry, such as they ought to be, to carry heavy weights long distances, and without that they are useless for work or war, and not fit for much in time of peace, and when you have got them they will take from one to two years to make. About 30,000 horses have gone from England to France during the war. At the time our Government were hesitating about giving £40 each for 2000 artillery horses, Gambetta sent an order to give from £45 to £50 for 2000, and this, I suppose, decided our authorities to give £40; so that we may thank Gambetta for getting us a better article. In the Crimean War, £40 was given; since then the price came down to £30 for three-year-olds, and £35 for four year-olds. Then no four-year-olds were bought for a time, unless they could be got at about the same price. Farmers and breeders would sell useful lean three-year-olds early in the year at £30, but would not keep them till four at anything like the same price, as they found useful horses worth £40 or more. Then the Prussians and Austrians came into the market, and bought up all the useful, quick, active riding mares at from £35 to £40 or £45 each. In seven years, from the two ports of Hull and Harwich alone, about 14,000 mares were sent off. These were the mares which we ought to have retained to breed from. They are the very things we now want. If one-half only had remained to become brood mares, we ought to have had at least 5000 horses per annum from them, and they would most of them have remained in the country, had the price given for our troop-horses been £5 higher; therefore you are suffering from the effect of buying a low priced and inferior article. Most of the light troopers of late years have been purchased in Ireland at about £30. The price given has not been enough to induce breeders to breed and keep good animals for the purpose of the army, more especially as the demand has been small and intermitting, instead of remunerative and continuous. The mares are gone, and it will take years to replace them. The price of horses, like everything else, is higher in England than elsewhere, and are not likely to be cheaper, but dearer. Upwards of 60,000 were eaten in Paris. How many were used up and eaten during the war, it is impossible to tell; but it must leave a very large demand for them as soon as things settle down again after peace is established.

KIND OF HORSES WANTED—HOW TO GET THEM.

To supply our army properly, is a question of money, and of money consistently and regularly laid out, not by fits and starts, which sends the trade into other channels. As our

d breeders can grow cattle and most any size and shape, and to it perfection, so can they grow ny stamp; but they must be grown they will not be grown by men o get their living by their business. f animal we really want to carry the short-legged active hunter, icestershire horse, but the horse es and close counties. This horse, kind, is worth 50 or 60 guineas four years old, and many of them s or more. How can they be got s for 30 at three years, or 40 at except the inferior animals which will not buy? Such a horse as I ibed, at five or six years old, ought to carry 16 stone from London to ;o miles in the day, and back the ould not keep a horse to ride that do it. My horse carried me up- ;o miles with the Queen's hounds igain, besides 40 miles in the train, y, the 21st of February, and was next day. A friend of mine often to Brighton in a day, on small s them there, hunts, &c., and rides ondon the next day. But where find a trooper's horse to do it? or out of a hundred would get to nd back in two days? If they can- they are not efficient, and therefore n an emergency. As far as I can we have not more than 10,000 id these only on paper. What the er of horses fit to carry men, and their work, I have no means of but as we want 4000 this year, or re than one-third of the whole looks as if the parsimonious fit a long one this time, and therefore ires a large sudden outlay. In d Austria, the calculation is about it. annually, so that we ought really oo; as we want 4000, it is 40 per eu of 10, and this is what they call In Austria and Prussia, they have ant, and reserves. They are ready, , which is the best and cheapest in

HOW THEY RAISE HORSES IN AUSTRIA.

I will tell you, gentlemen, what they do in Austria, and I get my information from an officer of cavalry, who was for a great many years in the Austrian service, and one of the best judges of horses met with, and who was constantly employed in the purchase of horses for the cavalry in Austria, and of horses, stallions, and mares, thorough-bred, obtained from this country for the Austrian Government, and who has attended many of your agricultural shows. The colonel tells me that they have about 4000 stallions, covering gratis, or at a mere nominal fee, for the Government. They have no prior claim on the produce. The remount department purchase as any one else in the open market, at about the following prices: — Heavy cavalry and heavy artillery, £32; light cavalry, £25; pack horses, £15. I believe they buy not under four or five years old. In 1854, he purchased in one district for the remount 1500 horses in about four weeks at these prices, and good useful horses, which were all passed by the officers appointed, who are very particular. There are several public breeding studs. The stud at Kisbeer was established by the present Emperor, and is entirely of English blood. For this stud were bought Buccaneer for 3000 guineas, Ostregor I sold for 3000 guineas, Teddington (Derby winner) 1400 guineas, Daniel O'Rourke (Derby winner) 800 guineas, Sabreur, Cordington, Oakball, and others of a high class of thorough-bred horse, amounting to from twenty to twenty-five in number, all bought since 1860. Forty thorough-bred mares were purchased for the stud at 200 guineas average, at the late Sir Tatton Syke's sale alone, and many others, partly thorough-bred and partly half-bred mares, amounting to between 300 and 400. The colonel purchased, in two or three years, about 150 mares, the best of the old Irish blood, for Austria. He would not buy half-bred English mares, however good-looking, for this stud, because he could not depend on their back blood, and was afraid of their throwing back to the cart or under-bred

horse, and so being soft and slow, and therefore bad. From this stud, commencing with the best stallions from England, are bred the stallions which are sent into the country to breed from; so that Austria and Hungary deserve to have, and have, good horses. Another stud at Babolua consists entirely of thorough-bred Arabs. The young stallions from this stud are also free to the breeders. Another stud at Mezyhægyes is of a large breed of horses, Old Neapolitan and others, chiefly greys, and adapted for carriage horses and heavy artillery. These are also free, and are independent of the private studs, the property of the Emperor, for whom I purchased Challenge for 2000 guineas, some years since, to win one particular race in Hungary, which he won, beating Rama and others. There is also a stud at Radantz. In this the horses run wild, and have a range of country of between 15 and 20 square miles. The other studs have from 20 to 60 square miles, I believe. All the above information I have to thank the colonel for, and no officer had a larger experience or bettter judgment. Now that the national studs are taken out of the hands of the military, and placed under the management of civilians, he has retired from the service and lives in England. My friend, Mr Cavaliero, of Vienna, the Weatherby of Austria, has also been kind enough to write me a long letter on the subject, as follows:—

Vienna, Feb. 5, 1871.

I received your letter this morning, and hasten to reply to your questions to the best of my knowledge and ability. The brief information I have given you is based on facts; you may, therefore, boldly cite it at any public assembly. Of late a great deal has been written about English cavalry horses; about the Prussian cavalry feats in the present French war; about the excellences of the Arab, &c., &c.; but I fancy, after all, that not alone Englishmen, but the whole world, will admit, and all arrive at one conclusion, that there is no cavalry equal to the British, no breed of horse like your own. At Willesden paddocks there lately stood fifty entire horses from Normandy, from the stud of M. de la Ville, transported thither to be out of the reach of the Prussian marauder; no English breeder thought it worth his while to drive the 5 miles to see the world-renowned brutes —and if fifty Arabs had been standing at the same place, I doubt if there would have been any visitor put in appearance. This circumstance convinces me at once that Englishmen are satisfied with their own, whatever they may write. The Prussian-bred horses are better looking than the Austrian; the latter, however, are far superior for their adroitness of movement, their strength, and for their endurance; but, in my humble opinion, far inferior to the English. For any sake, admit of no Arabs to come into your studs. These animals are all very well, and good in their own countries, but when removed they degenerate and sicken; they can instil no quality so good as that you are able to derive from your own stock horses. Send me over a dozen of your farmers to this country, deprive them of their hunters, put them twelve months on German food, and then ask them if their skins fit them as well as they did before they left home. . . . That horse-breeding and the management of horses has of late years vastly improved on the Continent, no one can deny; but I cannot understand how one can call the colt by Buccaneer, out of Lady Elizabeth, by Trumpeter, trained by Mr Hayhoe, jun., of Newmarket, ridden by Madden of Middleham, a German. And now in reply to your questions:—

1. The Austrian Government keeps no establishment for breeding cavalry horses; her wants for the army are furnished by private breeders and dealers.

2. To further and facilitate horse-breeding, Government entertains about 4000 entire-horse, which are distributed throughout the country, and cover at a low tax. The stallions are partly half-bred English—English Oriental—the lesser part home-bred; but very few thorough-breds of any race.

3. When an urgent demand for military horses is called for, cavalry officers are appointed to secure the number of troopers required, which they obtain from dealers and contractors.

4. In time of peace, admitting a stand of 35,000 horses, the annual remounting may be calculated at 10 per cent.

5. Remounts under five years old are not admitted. Maximum price, £30 sterling.

6. About 13 stone.

I shall feel most happy in providing you with any information you may require from this country.

Mr Cavaliero has at different times purchased a large number of mares: some on account of the Government, which have been resold again in Austria and Hungary, where funds are provided for the purchases, to which the Government contributes, and the mares are purchased here, and resold on their arrival out to the highest bidders, very often realizing a good profit. These are all thorough-bred mares, which are thus distributed over the country. Certain societies, aided by the Government in the first instance, making the purchases, which a private indi-

uld not well do. All this shews the ue placed upon the thorough-bred iorse in Austria.

PRUSSIAN CAVALRY.

very much indebted to Count Lehn-le-de-camp and Master of the Horse Emperor of Germany, who took the to answer my questions, although engaged at the time in the war, and etter I give almost entire, as every o the point. I hope soon to have ure of thanking him in person, for ls to be here to buy as soon as he sibly leave. He is an admirable d knows more about our thorough-rses than almost any Englishman I nd he knows all their pedigrees ormance, and where to go and find

eat pleasure I will answer your questions.
Prussia, 1440, in Saxony and Mecklenburg, , makes for the whole north of Germany ons.
at 150 cart horses for some mountainous 150 thorough-breds, the rest half-breds sses, from coach horses to the high-bred

Prussian Government keeps three breeding a altogether 600 high-bred mares, 50 of them breds.
iorses bred by the Government are taken for ; all the young stock not likely to make itry stallions are sold by public sale at four

All horses for the army are bought from eeders as three-year-olds, at an average price iineas, and kept then in different depots till old, at about 8 guineas expenses for each ; tly, they cost the Government, till the hey are delivered to the different regiments, s a-piece. Four committees, consisting of cers and one veterinary surgeon each, are ese horses during the summer throughout : kingdom, but particularly in East Prussia of the Weichsel).
; at prices from 6s. to 15s. the mare.
cavalry, artillery, and the train, for the whole Germany about 5500 a-year.
our-and-a-half years old; but they are not do the service like old horses, earlier than old.
French make a great mistake in calling all y Uhlans, we only mean lancers by this ex-

The weight our cavalry horses have to , rider, saddle, arms, &c., *Cuirassiers* kilos.) total about 141 kilos.; *Uhlans* (the rider 72 kilos.) total 128 kilos.; *Dragoons* and *Hussars* (rider about 68 kilos.); total about 119 kilos.

9. Only horses with a *certain amount of blood* are bought for the army, particularly for cavalry, common bred ones cannot go fast enough carrying those heavy weights.

I fancy that the strong point in our breeding good cavalry horses lies in our well and constantly bred half-bred stallions, bred for about fifteen or twenty generations in the Government studs, always with the same intention and on the same principles. Private breeding studs are always too often changing their intentions and principles, even oftener, perhaps, than their owners, and I think General Fleury made one of his greatest mistakes when he broke up the Government's breeding establishment at Haras-du-Pin.

I have also been honoured by the following copy of a report sent last year by Lord A. Loftus, from Prussia, on the purchase of brood mares, &c., in England, sent me by the Right Honourable the Speaker of the House of Commons.

THE PURCHASE OF BROOD MARES IN ENGLAND.

Although the direction of the Royal stud have not in that capacity directly purchased brood mares from England for many years, but have rather confined themselves to the purchase of thorough-bred stallions, for the principal Haras of Frahchmen, Graditz, and Neustadt, as well as of half-bred stallions (Clevelands, Norfolk trotters, and roadsters, and Suffolk cart and draught horses), nevertheless, they have indirectly supported a society, which met last year in Hamburg, for the purpose of buying English thorough-breds and Normandy half-bred mares, in England and France. And accordingly, Count George Lehndorff, the Master of the Horse, at the cost of the Government, in conjunction with the Brunswick Master of the Horse, Von Gersenell, undertook to carry out these precautions. These purchases amounted, in the year 1869, to forty thorough-bred mares from the best English studs. The mares, some of which had foals, were sold here to the highest bidders, and the prices obtained for them fully covered the expenses. The direction of the Royal stud also took part in this auction, and competed for mares. It is expected that similar purchases will be renewed on the part of the same society, and that the same commission will purchase mares this year also. But the direction of the Royal stud will not make purchases this year of thorough-bred mares, as the breeding of thorough-breds is only carried on in one Hara (Graditz). The object of the principal breeding establishments being to provide brood mares for the principal Haras, and as there is a much greater want throughout the country, and amongst the large and small proprietors for broad strong-boned, thick-set, half-bred stallions, with good action, than for thorough-bred stallions, which, especially in the west-

ern provinces, cannot be disposed of. With respect to the general condition of horse-breeding in northern Germany, the production of the article in the best horse-breeding districts is principally in the hands of small breeders. The State has in every Prussian province a so-called breeding establishment (Langestrib), which consists of from 80 to 300 stallions. At the commencement of the covering season, these stallions are distributed over the whole province, and cover at their different stations, for a small payment of from two to four thalers, the mares which are sent to them, of both the large and small proprietors. These stallions are in part reared in the principal breeding establishments. Trachchen contains 300, Graditz 200, Neustadt 100 brood mares. But the produce of the Royal breeding establishment does not half suffice for the wants of the provincial Haras, and from sixty to eighty stallions belonging to private owners always remain there. Should the home and the foreign market hesitate to purchase, we have to thank this arrangement, that the export of horses to the south, to France, and to England, is not unimportant, and the Governmernt at any rate are enabled to cover by native produce the demand for horses for the army. In the year 1866, with the exception of 600 horses, which were bought from dealers in England, all the horses required for the army by the increased demand were obtained within the country. The province of Prussia alone, decidedly the richest in the production of horses, supplies the army alone with 3000 horses per annum.

HOW TO IMPROVE AND INCREASE THE BREED OF HORSES.

No one takes more interest in the subject of improving and keeping up the supply of the breed of our horses, than the Right Honourable E. Denison, the Speaker, who has done me the favour to discuss the subject at different times, and sent me this report to make use of on the present occasion, and gave me his sanction to say that he had sent it me to shew his interest in the subject. I shall presently give what I believe are his views as to what can best be done—that is, supposing that the Government will take no active part in the matter; but, as usual, leave this, a national matter, to be carried out by the talent and energy of private breeders. I have now shewn you from the highest authority what Austria and Prussia, two of the greatest military nations of Europe, think it necessary to do, in order to provide themselves with horses fit for their cavalry. The Emperor Napoleon also did all he could to encourage the breed of horses in France, and above all did all in his power to encourage racing and the breeding of thorough-bred stock: with what success the annals of our turf during the last few years will bear witness. It will be long before France finds another ruler who will do as much for her breed of horses, all the best strains being English blood imported into France during his reign. He understood and appreciated England, and did more to cement the union of the two countries, by associating them in their sports, and particularly in racing, than all the Republicans will do in a century: but that reign will not, I think, be long, and the princes of the House of Orleans are thorough sportsmen, as we Englishmen know well who have met them in the hunting field. But in the Emperor we lost a good friend, and whoever the ruler of France may be, will, I hope, follow in his footsteps, as far as the national sports are concerned, and the national sports and amusements have much to do with the national character. Should we be what we are without fox-hunting and racing? Most decidedly not. These two have made us a nation of horsemen, and it is with shame and sorrow that I have come to this conclusion, that we have allowed other nations to set us an example of how to breed horses for the national uses. Still, with all our shortcomings, from want of a system alone, I believe as much as I ever did, that there are no horses like our own English horses, just as I believe there are no men like Englishmen; no women like Englishwomen; no farmers like English farmers. But as in our army, so especially in our cavalry horses, having discovered our weakness, let us set about finding out the best way of repairing our errors and recovering our lost ground. There is no doubt that this is a national question. In my mind there is no doubt that the Government ought to take it up. I do not believe they will. If they do I shall be agreeably surprised. But supposing they do not. What then? Well, gentlemen, we have, fortunately, still left in this country what they have not in many countries, a large number of noblemen and gentlemen with large

estates, and most of them all the rt, with the innate love of sporting. eat bulk of them are fox-hunters at A few have degenerated, and become ers on an extensive scale; but they ery small minority. Then we have a hich no other country has; the very ne of England, many of whom I see fore me, the gentleman farmer, always sman at heart, who, with ample capi- intelligent views, combines business easure, and is naturally a breeder of either to ride or sell. These two uniting as they do in every agricul- strict, carry great weight, and set the hion, and more, perhaps, in the breed- horses than anything else. Noble- ıd gentlemen do, and may do, much; is through the medium of the local ural societies that I see the means ıroving our breed of horses. If vernment will not assist, as perhaps ght, in offering prizes of £50 or £100 best stallion in each district which ved mares a season at not more ; then the Government must make minds to pay £40 for good three- ls, and £50 at least for four-year-olds, n will not get the best. If the local s will take the matter up much may e by degrees, but not at once. It ears to get up a good breed of horses, ly when you have let the mares go. be done through the stallions—and e plenty of well-bred horses, if well- selected, and if you make it worth their while to cover at a low price. Perhaps if the London Farmers' Club set the example, and offered a good prize to the best stallion shewn at the Royal Agricultural Society Shows at Islington, and who had fulfilled certain conditions, it might also give a spur to local societies; and a strong deputation on the subject to the Master of the Horse, Lord Ailesbury, might be of use—he understands the subject. It will not be of much use to go to the Chancellor of the Exchequer, as he contemplated putting a tax on every brood mare in the country, which certainly looks like an Irish way of encouraging the breed of horses. He had better tax every brood mare going out of it, but then the Free-traders would be up in arms. Free-trade carried to excess in some things is quite as bad as Protection. Recent events have taught us with the stern logic of facts as startling as the world ever saw, that in believing in the doctrine of universal peace we have been living in a fool's paradise. The millennium has not yet come—the lion has not lain down with the lamb—and when it does, as the Yankee said, "the lamb, I guess, will be inside the lion!" We must be like the strong man armed, especially in cavalry and artillery, and then once more we shall be feared and respected by our neighbours, and the "Civis Romanus Sum" of Lord Palmerston will be no idle boast, when it is understood again that the same meaning is conveyed in the words—"I am an Englishman.

GORGING IN HORSES

DURING the autumn months in ordinary seasons numbers of horses suffer and some die from eating too freely of tough, indigestible clover and vetches. The usual symptoms consist of colicky pains, dulness, abdominal distension, generally terminating after a day or two in more violent evidences of inflammation of the bowels. Throughout many parts of England where cut food is in common use, the heavier descriptions of horses are being now supplied with large quantities of wheat cavins and of wheat straw cut into chaff. In moderate amount, in conjunction with mashes or other soft food, such fare would do little harm. Given in quantity without moistening, it is most injurious. Being in a tolerably fine state of division, it is rapidly swallowed by hungry horses; it undergoes little softening from the saliva and trifling trituration from the teeth; its hard, tough, silicious textures resist to a great extent the solvent properties of the gastric and other alimentary juices; throughout the small and even in the larger intestines, the chopped straw is found imperfectly broken up; it retains its original form; its transverse fibres are in part disintegrated; its longitudinal fibres, however, are little changed, and have still all their stiffness and hardness. Thus imperfectly reduced, the straw can yield little nutriment; it becomes a mechanical source of irritation; it is not in a sufficiently pultaceous form to pass rapidly through the bowels; it accumulates in the small and still more in the large intestines, giving rise to serious derangement.

The cases vary somewhat in their intensity and duration. They are ushered in by colicky pains, pawing with the fore feet, straining, suddenly lying down, rolling, and as suddenly getting up again. In the less acute cases, the patient in the intervals between his colicky spasms is very dull, hangs his head, and does not care to be disturbed. There is gradually increasing abdominal fulness, but there is seldom the sudden and excessive tympanitis which follows the eating of wet clover, green corn, and the like. Except during the paroxysms of pain, the pulse and breathing are not much quickened. The attendants usually fancy that something is amiss with the bladder, and say that if the animal could stale freely he would be all right. This straining and effort at urination do not, however, indicate any actual disease of the urinary organs themselves, but are merely the irritability depending upon sympathy with the adjacent deranged digestive system.

The principles which should regulate the treatment are these:—The horse must at once be restricted to a sloppy mash diet. All chaff, chopped food, and in the first instance even hay, should be scrupulously withheld. Water and all manner of drinks, should be freely supplied, so as if possible to moisten and wash onwards the crude indigestible mass. Further, to hasten its expulsion, a full dose of physic is requisite. For a big horse, 6 or 7 drachms of aloes may be given in solution; and, if no effects are observable in fifteen or eighteen hours, a second dose of 4 or 5 drachms, also in solution, should be given, or, instead of the aloes, may be substituted a dose of oil and calomel. To encourage the unloading of the bowels, back-racking and soap and water clysters should be resorted to at intervals of two hours. To relieve the painful spasms antispasmodic draughts consisting of ether ammonia, and opium, may be given. For the same end, hot fomentations and mustard are applied over the abdomen. The more sensitive nature of the horse, and his greater liability to inflammation of the bowels, prevent the possibility of cutting into the digestive canal, and mechanically removing masses of indigestible food, as can be done with perfect impunity in cattle. Even after the

are partially emptied, it is most im-
: to watch the animal, attend to his
ıd, if need be, continue the adminis-
of laxative medicine. Frequently,
few movements of the bowels, all
is thought to be past; the animal
to his ordinary feed; the bowels again
: overloaded, and serious relapses thus
After attacks of indigestion, colic, or serious accumulations of indigestible matter, the digestive canal, it should be remembered, continues for some considerable time in a weakly and irritable state, and patients that have suffered from such attacks should accordingly be very carefully dieted, and supplied only with easily digestible, comparatively soft and not too bulky nutritive food.

The Dairy and Poultry-Yard.

CHEESE FACTORIES.

THE system of co-operative dairy farming similar to that in operation in America, Sweden, Denmark, and Switzerland, has not yet taken deep root in Great Britain. It is difficult to account for this want of energy and enterprise on the part of the British farmer. It may be his proverbial dullness, or an obstinacy to entertain anything like "new-fangled notions." But, whatever the cause, it is certain that British cheese-producers are very far behind Continental and trans-Atlantic dairy farmers, and our American cousins are taking advantage of our lack of energy. By means of co-operation they are enabled to produce, and to introduce into this country, as good a cheese as our own at a much cheaper rate. Such indifference is unpardonable, when it is taken into account that the same success that has attended the principle of co-operation in dairying in other countries is equally attainable in our own. The Derby factories are demonstrating that fact, and we hope soon to see factories established in other counties.

In America, co-operative cheese-factories are of two kinds—viz., the joint-stock factory or the limited company. In the former, land is bought, buildings erected, plant fixed, shares taken by a number of individuals, and a manager appointed to run the factory. The whole produce of milk is sent by each of the farmers having an interest in the concern, and the proceeds divided at the end of the year. In the limited company or co-operative society, one or more persons erect a factory, and either buy the milk from the surrounding farmers, or take charge of it and manufacture it at a fixed rate. In either case, every farmer concerned is bound to convey punctually his milk, night and morning, this being done by carriers, or by the farmer carrying it in his own waggon. The carting of the milk is not found in the slightest degree detrimental to the cheese; the distance being restricted to two, and at most five miles. On arriving at the factories, the milk is hauled up by a windlass and weighed, then run off into vats below—a receipt being given to the carter. Such a system has been tried at Derby and Longford, and the results have fully justified the confidence of all concerned. No factory, to pay well, should have less than three hundred cows, while five hundred, eight hundred, and one thousand are more profitable. Three skilled men and one boy are found to be sufficient for the management of a dairy with one thousand cows.

The progress made in American co-operation may be gathered from the fact, that, in 1854, there only existed four factories, while in 1864 there were two hundred and ten. It was calculated in 1866, that the produce of no less than two hundred thousand cows was passing through the factory process of cheese making in the State of New York alone, and since that time the increase has been very great. As we have said, such a system is found to work in England with success. What is to hinder its general adoption? Such institutions would prove a national as well as an individual benefit. Economy of labour is a great desideratum amongst our agriculturists, and the factory scheme supplies such a want. Individually, our farmers are weak, and cannot compete with anything like a successful issue against such a vast and increasing rivalry as the American cheese trade represents, while a concentration of force, by union, would make them almost unassailable.

: *BREEDING AND MANAGEMENT OF POULTRY.*

By the Rev. A. G. BROOKE, Shrawardine.

.OOKE said—It must surely be iitted that for some time past much neglected our farm-yard h, in these days, formed such an irket commodity as food for the vhich at present might be de- quantity of fowls of all sorts and the result of breeding in-and-in st, the owner continually grum- e they cost so much to keep. ;enerally was left to a personage e boy who fed the fowls and e eggs, and most liberally threw il after handful of grain with in discretion; while in the win- gs are scarce and might be a it, few, if any, were to be found. iltry profitable, they must first of h a breed which would ensure . Having been a most suc- itor and breeder for nearly and having kept almost every feathered tribe, he would sug- / should either send to market se of every fowl in their yards, mmence with an entirely fresh iat they should keep about a best and biggest of the pullets,)ther "bold chanticleer," and e fresh blood amongst them.

EST KINDS TO KEEP.

d starting with an entirely fresh he strongly recommended, he uld answer their purpose best Brahmas—say a two-year-old pullets, by way of a start. The s were very hardy, extremely good mothers. If hatched in)uld lay during the winter, and, supply of food the chickens at- d flesh very fast, could soon be got ready for the market, and were by no means coarse for the table. In addition to this, they were handsome, and an ornament to the farm-yard. The eye was naturally pleased by seeing a true and pure strain of fowls foraging about, and in these days of poultry exhibitions, good birds (especially of this breed) commanded high prices, and they would be found very remunerative. He commenced keeping Brahmas some four years ago, and the first time he exhibited them was at Middleton, near Manchester, where, with a cockerel seven months old, he won the first prize; and the bird was sold at the catalogue price, £5. In this breed he had been most fortunate, and he had sold most of his birds at the rate of 50s. a cockerel and two pullets, the others being used for household purposes. The pullets he saved each year for winter laying, were invaluable. As a rule, he preferred purchasing birds rather than eggs for hatching; and now that poultry shows are so numerous, Brahmas might always be met with at fair prices. In thus strongly recommending Brahmas as best suited for farmyards, he did not wish to speak disparagingly of the many other useful varieties of fowls which we have, such as Dorkings, Cochins, Spanish, Game, and Hamburgs. But were he a farmer, and wanted a really useful and remunerative breed for hardiness, fast growing, and sure and certain winter-layers, he would keep Brahmas—Brahmas, and nothing but Brahmas.

HOW TO PRODUCE LARGE FOWLS.

Another suggestion which he would offer, was that of keeping some of the best and biggest pullets, and turning down with them a fresh cock. Here he would recommend either Dorking or Brahma as being most suited. If we looked into our markets we did not find the dead poultry offered there for sale much larger than it used to be, with

before the Midland Farmers' Club.

the exception of turkeys, geese, and ducks, in which a vast improvement was to be noticed. And here, again, the result of having only first-rate strains to breed from soon shewed itself. A good strain would cost no more to keep than a bad one. To shew how much ducks have, of late years, improved in weight, he might state that, at the last Birmingham Show, the first prize Aylesburys weighed over 18 lb. the couple. Seventy-two pens of Rouen ducks competed there, and the first prize couple weighed 19 lb. 4 oz. Geese weighed 58 lb. and 56 lb. the couple, and goslings of last year 49 lb. The first prize adult turkey cock, which came across the Atlantic to compete, weighed 36 lb. 4 oz. This bird was now the property of Mr Frederick Lythall, and won the silver cup at Bristol during last month. Both the prizes for turkey cocks of 1870 went also, at Birmingham, to the same gentleman, with birds weighing 24 lb. and 23 lb. each. The old prize hens weighed 35 lb. and 34 lb.; the young ones 31 lb. and 29 lb. If they bred from such strains as these, they may go and do likewise.

IMPORTANCE OF FRESH BLOOD AND GOOD CLEAN HOUSES.

But, whatever their breeds of poultry, they must be careful to infuse fresh blood into them every spring. As regarded management, the most important point was to have a properly-constructed, well-ventilated poultry-house, with plenty of light, and free from draught. By all means have this before entering on a fresh breed of fowls, as on their arrival they can be shut in for a few days in their new abode, and thus learn to return to it for the purpose of laying and roosting. Have the door well secured by two flat iron bars to go across it, fastened with staples screwed into the post at one end, and by patent padlocks at the other. There should also be a sliding panel in the bottom of the door for the fowls to go in and out during the day, and the lower iron bar should go across this panel when shut down for the night. The walls of the house should be limewashed at least three times in the year. The perches should not be more than 3 feet from the the ground, and ought to be, at least, 3 inches wide; a larch pole, split in halves, answered the purpose admirably. These perches should be placed all round the house, about 3 feet distant from the wall, not one above the other, and care should be taken that there are no beams or rafters that they can fly up to in the roof, as in their descent they alight on the ground with great force, which is the cause of so many chicks being bumble-footed and gouty. Round the walls, on the ground, at convenient distances, place three bricks, to form a square nest for laying and sitting; in these place some hay and a china egg. He preferred this plan to boxes, because they are easier to keep clean, and the other fowls cannot roost upon them to disturb the sitting hens. The centre of the house being an open space, there is room to have the droppings properly raked out from under the perches once or twice a-week, and fresh earth or coarse sand thrown all over the floor, and well raked over. The value of these droppings, as manure, could not be too highly estimated. The cleaner the fowl-house was kept, the healthier would be the stock. Let the floor be well littered with straw, and occasionally shook over, or changed.

HOW TO FEED.

In winter time, eight o'clock is almost early enough for fowls to be let out of their house, but before so doing it is a good plan to give them a liberal supply of soft food (warm if possible), as it will teach them to become attached to their abode, and the sitting hens will reap the benefit of a regular meal. By soft food he meant potatoes boiled the night before and mashed up when warm with Indian or barley meal. Corn should be given in the middle of the day, and again before going to roost, in the vicinity of the fowl house. Cabbages should also be specially grown, to be given them daily during the winter months. In summer time they can, in a measure, cater for themselves. The sitting hens would also be much benefited by having a cast-iron trough (costing about

ed on two iron brackets fixed in the the house about 1 foot from the to contain water, which ought to be every morning. As regarded the f chickens, he would only say, when e coop they should receive a liberal ittle and often, of different kinds of , above all, particular care must be it the water given them to drink was l often changed. In drawing his o a close—though he could assure t poultry may be made a profitable adjunct to the stock of the agriculturist, and a source of great pleasure and amusement to the amateur, and that, with proper care, judgment, and attention, it will be exceedingly remunerative, yet he trusted that they might in the course of time be allowed another discussion on the subject, and learn much by listening to the experience of some members of the Club who might take heed to his suggestions, which, out of pure love for things appertaining unto poultry, had been humbly offered.

PRESERVATION OF EGGS.

subject has recently attracted a eat deal of attention, and many of effecting it have been published, one are altogether perfect, for the ason that the true cause of the spoil- e eggs is either unknown by those attempted to furnish us with direc- has been lost sight of by them. two efficient causes for the spoiling nd unless one or both of these are we cannot hope for success. The posure to a high temperature, and is access of air. It may be safely hat, at temperatures below 32 deg. ly all change ceases in organic bodies, y few organic substances will bear exposure to a temperature above The freezing-point is rather too low reservation of eggs in good condi- reezing affects the flavour unfavour- t if we desire to preserve eggs in manner, we must keep them cool a temperature below 50 deg., , a temperature which is frequently d in good cellars. But it will be to place the eggs in a cool cellar if been previously exposed for hours erature of over 90 deg. The col- the eggs must therefore, in the first gage our attention. Now, it has been well known that hens are most inclined to set in the months of May, June, and July, and that, during these months, the eggs in the nest are peculiarly liable to be set upon by brooding hens. On the other hand, during the month of August, and subsequently, the tendency to brood is not so strong, and the eggs are less liable to be injured. Those who raise poultry, and especially those who keep fowls for the sake of their eggs, commit a great error when they fail to remove from their yards those birds that are inclined to set, and which consequently take every opportunity of warming the eggs in the nests. If any one will attempt to preserve eggs that have been subjected to the hatching process for one or two days, such person will soon, and very easily, discover the force of these statements.

Kohler, of Germany, who possesses an extensive poultry-raising establishment, and who, every winter, preserves thousands of eggs without ever loosing one, has recently published an account of his method of proceeding, and has given the following rules for securing favourable results :—

1. The nest must be placed in a cool position.

2. The fowls that shew a tendency to set must be removed at once, and placed in se-

parate enclosures until this propensity has left them.

3. If many chickens be confined in the same enclosure, or use the same nests for laying their eggs, the eggs ought to be removed from the nests several times a-day.

4. The eggs ought to be assorted according to age, and preserved in boxes with the covers always partially open. These must be kept in a cool, airy, and perfectlydry place.

5. At the commencement of winter, the store of eggs is placed in some room that is not heated by a fire, but that is, at the same time, thoroughly protected from frost.

6. The packages are so arranged that the oldest may be used first.

Eggs treated according to these rules do not acquire the peculiar taste which is generally the result of the recipes in vogue for preserving eggs. The number of these recipes is almost unlimited. Some recommend the use of lard or butter, which, when rubbed over the eggs, fills the pores, excludes the air, and prevents the eggs from drying out. That there are powerful causes in the spoiling of eggs is easily proved, for the time t elapsed since an egg was laid may be estimated by taking its specific grav we dissolve common salt in water, at t of 3 ounces of salt in 25 of water, it found that freshly-laid eggs will just this solution. An egg that has been l one day will hardly sink to the bott three days old it will float in the liqu and when five days old it will float surface, more of it being elevated abc surface, in proportion to its age. The nomena are caused by the drying out eggs, and the extent to which they tak in a given time depends somewhat weather. Smearing the eggs with l butter prevents this, but these oily mat apt to become rancid, and thus dest flavour of the eggs. Dipping the eggs i water is also recommended. The lit the pores of the eggs, and serves th purpose that the grease did. But of materials that have been recommen this purpose, water glass, or silicate o is the most effectual and least objectio

Hunting, Fishing, and Shooting.

CARRICK SPORT.

By "THE OLD SPORTSMAN."

fever for grouse and heather amongst
r neighbours of the south, has raged
first year I took out a game-license,
t, it appears to me, there are symp-
ts abatement. The first sign that
nd for grouse-shooting slackens, is
the over-supply of inferior beats,
by the reduction in rent of really
ges—for the former were the last to
the market, and consequently are
o be withdrawn. The best moors
tless be sought eagerly for many
come, but the ardour for grouse
o far cooled, that even keen shots
part, lost their zest for a toilsome
e wilds, often ending in a feeling of
tment and a light bag.

are other causes besides the weighty
heir exorbitant price, which keep
sportsmen from competing for a
looting. Many are alarmed by the
of grouse disease; but should the
free from this scourge for several
er a dry March and beginning of
e poor grouse-tenant will, in all
l, cast his first glance on favourite
' and heathery heights, to find them
nd blackened wastes.

elates chiefly to *tenants*, but even
's of moors, with a full staff of
and the sheep farmers bound not
he heather except under guidance,
en outwitted by these knowing
of the hills. What, then, have they
who take a long lease of a moor
t of the sheep-tenants is still longer,
unrestricted in their "tacks" about
burning? Even should there *be*
a the farmers' leases, limiting them
to a certain amount of burning, how are they to be enforced by the game-tenant? If he tries to do so, he will surely be only in part successful, besides making the farmers and their dependents his bitter enemies. Their revenge will be taken by "stamping out" every nestful of eggs, and destroying all young birds stumbling on their own or their collie's path.

Although bad breeding seasons are always discouraging to a sportsman, at times they prove the means of preventing even greater disappointment. They ward off the disease, hastened by a number of good years following each other, causing the birds to increase too rapidly. Many grouse-shots, however, despise such comfort, and are well pleased to let to-morrow take care of itself. Nor can we expect an enthusiast in the sport to regret a good breeding year, even when the heather is already teeming with last year's birds.

When the ground has just recovered from the effects of a wasting blight, and the few remaining birds are thinly scattered over a formerly well-stocked moor, a spring proving unfavourable for rearing the poults is perhaps a greater annoyance to a lover of the hills than even the malady itself! A season of this nature ruined the Ballimore range the second year of my lease. The birds began to choose their nests far too early in the year, encouraged by mild air and a brilliant April sun—unfortunately also in favour of the heather burners. By the beginning of May, the chicks were out of the egg, but a bitter wind blew during the greater part of the month.

The curse of drought was not "there shall be no rain," but, "there shall be neither rain

nor dew," which was brought to our minds that season when the strong easterly wind restrained the rain and brought no dew. In consequence, whole broods of poults were found dead in the water-courses and their neighbourhood, whither they had been led by their parents in the vain hope of a few drops of water. Many years ago, a similar tract of easterly wind would have killed all the young birds on my moor of Leny: but as it did not begin till June, they were able to fly to the mountain tarns, where I found the packs huddled together, the rest of the ground being quite deserted.

A cold showery April keeps the birds from laying their eggs till May, and is thus the best beginning for a good breeding grouse season. Even if the weather is still chilly in May, and the birds are forced by the advancing year to prepare their nests, the sun will be strong enough, before the young broods are hatched, to keep them alive. Before this, during the time of incubation, the sitting birds are quite able to keep their nests dry even in rainy weather—we must, however, consider the more distant upland ranges, and they are, perhaps, the most important of all to hill sportsmen. Should the ungenial April be succeeded by the same unsettled weather in May, snow is apt to cover the upper beats, and numberless nests may be addled by being buried beneath it for weeks. This is the cause (sometimes perplexing to sportsmen) why a whole hillside may scarcely contain a single pack, while the lower flats of the same range afford first-rate sport. With such doubtful prospects, I did not much regret being absent from grouse and heather the first time for many an exciting August.

When a veteran of the hills exchanges Highland for Lowland sport, he feels like a forest ranger turned into the gay paths of a "garden of roses." There is enjoyment, no doubt, but the pleasure is very different from the wild delight caused by the savage scenery of the peaks which almost "cleave" the clouds in their grandeur. In the bracing air, yet hot sun, of an evening in autumn, the whirr of a partridge or pheasant from a stubble-field or brake of ferns, may be reward enough to urge the hunter on that easy ground, but it needs the sight of an antlered stag or the crow of the "gorcock" to put the hillman of many summers on his mettle. What spirit and carelessness of hardship will will then be shewn with such a stimulus, worthy, no doubt, of a better cause!

Some low country beats have sporting capabilities which almost atone for their tamer game and scenery. A noble river of the south generally contains salmon of greater weight than its rivals of the north, the harvest fish running up freely as soon as the murderous nets are ordered away from its mouth. Any one so fortunate as to have a few pools of such water need not covet the red grouse of August, for, from the time of the summer floods till the fishing ends there is held out the prospect of salmon fishing, which surpasses the best sport on the moors, and, in the opinion of many excellent judges of any other pastime whatever.

"Whan the weather breks in thae pairts, it's ill to mend," is the only comfort given by the mountain shepherd to the "Sassenach" drenched to the skin. It is certainly very depressing after bright weather, and hopes in the south, to be greeted by the wet sponge of a "Scotch mist" on the 12th of August. This is often the case when the "Lammas floods" come late, or continue longer than usual. If, however, the shooter has also the taste of an angler, having a stretch of even a humble sea-trout burn, he will be consoled in a great measure for the "stormy mists" and rains. A salmon stream running through his grounds, the keenest shot would care little whether "the twelfth" dawned in murky clouds or in golden sunshine.

The most unsettled autumn I ever remember was passed within a few hundred yards of a sea-trout stream, by the banks of which I spent many a pleasant hour. Besides white trout of the largest size, yellow ones from a loch, nearly equalling them in weight, ran freely from July till October, the former giving fine sport with fly, the latter with minnows. By using very slight gut, I secured not only more rises, but the light

)laced the larger trout nearly on at
:h salmon. Thus, instead of brand-
: unfortunate year for *shooting* in my
, it is marked with white chalk for
ıl sport.

season I had cause to be satisfied
: salmon-water I had taken. There
ıe sure, only four regular salmon casts,
:e pools and streams are broad, deep,
:rspersed with minor ones for grilse
rout. In July and August, after a
ll of rain on Fridays or Saturdays,
ing is sure to be good for one or two
the beginning of the following week.
:r is perfect as to size—broad enough
l the finished execution of the most
sher, having always either bank suffi-
:lear to allow him the advantage of a
l throw from one hand or the other.

this stretch of river belongs the
hooting over the waste and arable
ı its banks. The shooting consists
kgame, partridge, pheasants, snipe,
ıd rabbits. Three miles farther off
: the hills, there are also a few coverts,
shelter of roedeer, and deemed the
'er for woodcock in Carrick.

ed scarcely be said that the district
rick is "the country of Royal

As I write at this moment, in full
my window is the Castle of Craigniel,
nghold, built by his brother Nigel,
om it takes its name; and many other
towers in the neighbourhood hold
memories of their king. Some of
re ivy mantled, and have for years
ade "the secret bower" of a white
ɔ, with his mate, holds undisputed
er his own domain, not chased about
ver to tower like the good monarch,
lace they have now usurped.

f the romance of Scotland's fugitive
; made the "Banks and Braes" of
ımous in story, her peasant bard has
them in strains familiar as the "Banks
ıes o' Bonnie Doon," "Behind yon
ere Lugar flows." Poor Burns! what
s in thy magic numbers; was there
y one could sing like thee? and yet
: that heart "sae weary fu' o' care"
teach lessons that, alas! it never learned,
while the history of such high powers, so
early wrecked, can but be held up as a
beacon-fire, rather than a guiding light.

Thoughts like these can hardly fail to suggest themselves, as one wanders with salmon rod from stream to pool, over the beautiful rivers of this country, trying snatches of those unrivalled lyrics, and remembering that it was the "Ayrshire ploughman," little less than the noble heart of Bruce, which contributed to render it "classic ground." Perhaps I ought to remark in passing, that the river which Burns has rendered immortal as the Lugar, is now known by the less harmonious name of Stynchar, but which was the original designation and which the corruption, it is not for a stranger like me to decide, especially as authorities in the county nomenclature seem to be divided on the subject.

A salmon fisher is deemed by those who watch him, as the river statue of patience. But making allowance for the different tempers of men, the fisherman's patience is generally in fair proportion to his knowledge of the sport and practical skill. These qualities are needed to ensure self-reliance, without which, patience in the art of angling would be only foolish endurance.

The general rules for salmon fishing apply to all rivers, as they are much the same with regard to flies, the best moods of the water and times of day for angling, on the top, in the middle, or at the bottom—viz., with fly, minnow, or worm. Almost every river has, however, some peculiarities, taken advantage of by the local fishers, but which every able wielder of the rod, especially if he has a fair amount of general practice, will quickly master. This is fishing knowledge, and only to be learned by long and keen observation. An active young man of good hand and quick eye, with some enthusiasm, will soon be taught dexterity, which consists in the power of commanding any water, whether by casting a very long line, or, in difficult streams, by pitching the fly between every small opening among trees, scarcely ever catching a twig, at other times throwing it clear of the

overhanging rocks with such unerring aim as rarely to break a hook.

Any one having both fishing knowledge and manual skill (for some reputed good anglers possess only one of these gifts), is seldom tried in his patience, because he is able to make use of his fishing time, not wasting it on the water as inexperienced anglers are apt to do, when success is more than doubtful. Of course, there are many men of little leisure, who generally need the services of some local "regular," to whose guidance they trust implicitly. Such fishers are not likely to gain self-confidence, or ever to become scientific craftsmen.

There were only two summer "spates" last season on the Stynchar, which is a very late river, though it may be lawfully fished on the 20th of February. The first was only a slight flood, but the rain fell on the fittest day of the week, beginning on Saturday evening, showers lasting a good part of the next day. This allowed a slight run of grilse and sea trout, but the river, on Monday, when we began to fish, was little raised, as the parched ground had absorbed so much moisture. We brought home, however, a fine grilse and sea trout, besides losing another grilse by the snapping of a Kendal wire. On the next day, although told there was no use in trying, we rose a third grilse, and landed another sea trout. The flies were some I tried for the Dee grilse many years ago, smaller than most sea trout hooks, while the body and wings were very dark. No other fishers were successful on the neighbouring water, most likely from using flies either too large or too bright.

The second "spate" was not so well timed: rain fell in torrents all Wednesday night, and Thursday morning—a fine "fresh" coming down on Friday. On Saturday it lowered into fair fishing trim, but there was no "flood during the slap," so we only moved two sea trout, but neither "took hold."

A plan was once mooted to take off the nets altogether, but the netters carried the day. "What greed of gain and gastronomic infatuation!" mutters the salmon angler, "to prefer a netted fish in the pot, to making their river one of the best in Scotland!"

Can there be better proof of the utter destruction caused by these river-mouth nets than that of these two spates? The first, though only partial, *happening at slaptime*, brought very fair sport for the low clear water of midsummer. The second brought none, merely because the sea entrance was so blocked up by nets, that even a whitling could scarcely find a passage. Last autumn a ton of salmon was landed at the mouth of the Stynchar from a Sunday flood! The excuses of course, being that the rough weather prevented the removal of the nets on Saturday night. What wonder is it that the Tay and other anglers find so little gain from all the troubles and expenses of breeding ponds, &c., when such deeds as I have related may be committed openly with so poor an apology!

Besides man's ingenious devices, this river has natural causes which often obstruct a free run of fish. A bar of sand across its mouth effectually blocks up the passage in dry weather, especially when the wind is easterly. The first flood after drought is seldom embraced, as the fish do not enter the river until its bed is cleared out. It is also better in all rivers for floods to subside and rest for a time, than to have a rapid succession of heavy water, as far more fish run when "spates" do not follow too quickly upon each other. A weak-minded angler of these parts, dubbed "Daft Hugh," is always contented when floods stop for a little while, for reasons of his own. On going to the river one day at its lowest, with rod and flies ostentatiously displayed, a neighbour inquired, "Hoo can ye expec' fish to tac' a flee noo?" "Maybee," quoth Hugh, "if they'l no tac' the flee, they'l tac' the cleek!"

(To be continued).

THE COUNTRY GENTLEMAN'S MAGAZINE

MAY 1871

BRITISH AGRICULTURE.

IT seems, and we are sorry to learn it, that a few farmers and landowners in England are averse from furnishing returns to the Privy Council of the number of stock in their possession, and the amount of acreage under crop. Their reticence is not good for the country, and we make bold to say is far from advantageous to themselves. Nothing is more certain that information of a right kind is the greatest boon that can be bestowed on mortals, and that it is as useful to the giver as it is to the receiver. The schoolmaster, as well as the pupil, profits by the instruction he communicates. We do hope, therefore, that next year the reporter will not have to write to the Board of Trade, and through that department to the public, in this way:—"I am sorry again to have to notice the prevalence of opposition to the returns, upon the part of owners and occupiers of land in some parts of England. It is *only in parts of England that difficulty is experienced* in obtaining, by voluntary returns, such simple but important national statistics as the acreage of crops and the number of live stock. In Wales and Scotland, the agricultural returns are most willingly given, and, it is believed, with much accuracy. If the occupiers of land in England who still oppose the returns, could be prevailed upon to follow the example of agriculturists in Wales and Scotland, the information contained in the returns could be made public at a much earlier period than is now practicable." This dog-in-the-manger policy among a few, therefore, detracts from the value of the information given by the many—in two ways: by preventing its completeness and delaying its communication; and in this age, detention is a synonym for loss.

Surely after this appeal made by Mr Fonblanque to those who withold that which would cost them nothing to give, and for the credit of England, they will frankly, next year, set down the number of their stock, and the area of their fields under the various crops. If they do not, one interesting piece of information might be furnished in the next report—viz., who are the people, and in what counties do they reside, who so obstinately hide their light under a bushel? During last year, the opposition appears to have been greater than in the previous year, the returns made being 529,150—11,676 less than in 1869. But this decrease is partly to be accounted for on the ground that many farmers who occupy more than one farm included all their information in one return. The total number of holdings in England is 393,569. Considering the outcry that has often been raised by pseudo-agricultural philanthropists against large farms—the "adding of field to field," as it is called—we find the number of small farms astonishingly great. Out of the 393,569 holdings there are 213,626 farms which do not extend to 20 acres—54 per

cent. of the whole. With these figures before one, it can scarcely be said that the small farmers of this country have not a chance. The number of small farms in Scotland is even larger than in England, amounting to 57 per cent., there being 45,434 farms under 20 acres out of a total of 79,603. In Wales, also, nearly half of the farms are under 20 acres, the exact per-centage being 48. The total number of farms is 55,978; those within the limit of a score of acres, 27,185.

The return gives us some interesting information with regard to the proportion of large and small sized farms in the various counties. Yorkshire is accredited with the largest number of small holdings in England, there being 64 per cent. of the occupiers of land in that county farming less than 20 acres. In Cumberland and Westmoreland, where there are a large number of sheep farms, the per-centage of small holdings is less than in other counties, being only 35. Northumberland, however, gives the greatest per-centage of large farms, having 35 per cent. above 100 acres. In Lancaster, small farms greatly predominate, there being in that county only 7 per cent. containing more than 100 acres. In Westmoreland, there is the largest per-centage of what may be called intermediate farms—between 20 and 100 acres—viz., 48; in Wilts, the per-centage of such holdings only amounts to 19. In Wales, the per-centage of holdings not exceeding 20 acres is as high as 68 per cent. in Flint; and as low as 24 per cent. in Brecon. Of holdings between 200 and 100 acres, Brecon shews 60 per cent., and Flint only 24 per cent.; of holdings above 100 acres, Radnor contains 21 per cent., and Merioneth and Flint only 8 per cent.

In Scotland, the acreage of agricultural land forms but a small portion of the total area in the hilly counties, and the holdings of cultivated land are there of a very small size. Of the total holdings included in the returns for Sutherlandshire, 95 per cent. do not exceed 20 acres. The county with the smallest proportion of holdings not exceeding 20 acres, is Ayr, where they only amount to 27 per cent. Of holdings between 20 and 100 acres, the highest proportion is 43 per cent. in Stirlingshire, and the lowest is 3 per cent. in Sutherlandshire; of holdings above 100 acres, the highest proportion is about 52 per cent. in Haddingtonshire, and the lowest is 2 per cent. in Sutherlandshire.

The quantity of land occupied under each class of holdings was not ascertained, but an estimate has been made to shew in what proportions the land under cultivation is probably divided between the small and large holdings in Great Britain. By this estimate it appears that, although the number of holdings of a size not exceeding 20 acres amounts to 54 per cent. of the total number of holdings, the probable quantity of land held by that class of occupiers is not more than 2,658,000 acres, or not quite 9 per cent. of the total acreage returned. The proportion of holdings between 20 and 100 acres is 28 per cent., and the probable quantity of land held is 7,810,000 acres, or about 26 per cent. of the total acreage. The holdings of a size above 100 acres are in the proportion of 18 per cent. of the total holdings, and the quantity of land held under such holdings is probably not less than 20,000,000 acres, in round numbers, or about 65 per cent. of the total acreage included in the Returns.

The total acreage returned for the United Kingdom as under all kinds of crops, bare fallow, and grass, in 1870, was 46,177,370 acres, against 46,100,153 in 1869. Of the total acreage in 1870, Great Britain had 30,407,579 acres; Ireland, 15,652,578 acres; and the Islands, 117,213 acres. In Great Britain, the land was divided between tillage and permanent pasture in the proportion of 18,334,723 acres, or 60 per cent., for tillage, and 12,072,856 acres, or 40 per cent., for permanent pasture; in Ireland, 5,661,610 acres, or 36 per cent., were under tillage, and 9,990,968 acres, or 64 per cent., were under permanent pasture; and in the Islands, 95,742 acres, or 81 per cent., were under tillage, and 21,471 acres, or 19 per cent., under permanent pasture.

The number of live stock in the United Kingdom, at the end of July last year was—Horses, 2,580,000, as near as could be ascer-

cattle, 9,235,000; sheep, 32,786,000; gs, 3,650,000; exclusive of porkers ı town and by cottagers with less than an acre of land.

variations in the corn crop during ast four years, as given by Mr Fon- ıe, are worthy of note. In 1870, there nder all classes of white crops, 210,000 less than in 1869, but 115,000 acres than in 1868, and 264,000 more than 7. Ireland had also less corn under ıtion last year, by 35,000 acres, than in ear before; 19,000 less than in 1868, ,000 more than in 1867. It will thus en that nearly all the gain accruing en 1867 and 1869 was lost in 1870, a erhaps, not so much to be regretted, lering the moist climate of the Sister The great decline noticed in the acre- opped with corn is almost solely attri- le to the less quantity of wheat being —barley having been committed to the in much larger quantities, as it yielded rtionately more liberal returns to the cer. The area under wheat in 1870 ess by 200,000 acres than in 1869, , it is estimated, would make a differ- of about 700,000 quarters in the yield s cereal. Barley occupied, in 1870, o acres more in Great Britain than in 220,000 more than in 1868, and o more than in 1867—an increase of 500,000 acres in three years. The e of barley is also rapidly extending in Ireland. In 1870, there was an se of 20,000 acres over the area occu- n 1869, which had 55,000 more than and that year, again, had 71,000 acres its fore-runner. In oats, the acreage d so little variation in the course of ur years, as to render any numerical s unnecessary. In Ireland, the cultiva- f oats, however, is gradually becoming limited. Beans and peas were less ıted in 1870 than in the previous year, rmer shewing a decrease of acreage to tent of 45,000, and the latter of 79,000 as compared with that of 1869. There tle difference in the breadth, however, as compared with that occupied in the years 1868 and 1867, in either case.

With regard to green crops, it is stated that there were 12,000 acres more under cultivation than in 1869, but an excess of no fewer than 200,000 acres over 1868, and 88,000 over 1867. We are glad to observe that the culture of green crops is extending in Ireland, as we think this is the direction in which, with her fine land and capabilities for stock-raising and feeding, she ought to move. In 1870, she had an increase of 30,000 acres under green crop, as compared with 1869, 42,000 in the last-named year over 1868, which again out-numbered its predecessor by 66,000 acres.

In potatoes there is little variation to note between the years 1870 and 1869, but last year the quantity of land cropped with this valuable esculent exceeded that cultivated for the same purpose in 1868 by 46,000 acres, and in 1867 by 95,000 acres. In Ireland, last year, there were 9000 acres more of land occupied by this tuber than in 1868, and 42,000 more than in 1867.

Of turnips and swedes there were 39,000 acres more sown than in 1869, which, perhaps, was to be regretted, seeing the untoward character of the season; and Ireland, where the roots did not suffer so much from the drought as in this country, exhibited, in 1870, a greater breadth, by 18,000 acres, than in 1869. Mangold, as a capital feeding root, continues to grow in favour, both in Great Britain and Ireland, there being an increase of 14,000 acres in the former country last year, over the preceding one. Little change is reported in the acreage of cabbage, kohl rabi, and rape; and there is a decline of 43,000 acres in 1870, as compared with 1869, in vetches, lucerne, &c. There has been a large increase in the cultivation of beet-root; 1429 acres being all that were cropped in 1868, while, in 1870, the acreage was 4332, or three times as many.

It is interesting to note that the cultivation of flax is rapidly extending in Great Britain. In 1868, we had only 17,543 acres under this crop, last year we had 23,957. The counties

where flax is most extensively cultivated are Cambridge, Lincoln, Norfolk, Somerset, and Suffolk. Hops have not been extending; but we are glad to notice that last year there were 128,000 acres of bare fallow fewer recorded. We should like to see no such heading in the returns at all, except under very exceptional circumstances indeed. The total acreage under clover and meadow hay in Great Britain was 5,136,000 acres; the estimated yield 4,830,000; the total value £16,560,000.

FARMING ON THE CONTINENT.

By Mr William Biddell.*

MR BIDDELL began his paper by sketching the route he had taken, and after having commented briefly on the many national peculiarities of France, Belgium, and Germany, he dwelt on the—

DIVISION OF LAND: INDOOR FEEDING.

Upon getting well out of Antwerp, the first thing that strikes an English farmer would be the extreme smallness of the plots into which the land is divided. The farms in Belgium average 11¼ acres each, according to Howard's Book on "Continental Farming," a work all interested in the subject should read—it is full of information, especially as regards cropping and wages. Until I reached France, where I observed much bolder farming, I should think two-thirds of the arable land I saw, was cultivated in plots not averaging more than 1½ acre. I suppose the divisions of ownership are well delineated on official maps, as I could perceive no posts—mere balks, or fences, to indicate the divisions. This extreme division of land prevents any costly or expensive machinery or implements being used. Steam machinery is, of course, entirely out of the question. It, I might say, in every way impedes good farming. As nearly half the land is farmed by its owners, this style of farming is not likely to be altered. To make it worse, these small plots are often a long way from the homestead, leading to what a former reader at this Club would call "a waste of force," it taking the farmer ten times as long to walk to get the cows a bushel or two of grass as it did to cut it. From there being no fences (in any parts, not even to fence the railways in), and but rarely water, grazing the land is quite out of the question. What necessity compels to be done there, it might be useful for us to follow here—viz., soil our green crops under cover in the summer time. We take great pains to obtain manure by winter grazing our roots, very often greatly injuring the land by carting them off. The fact that summer-made beef sells at from (coming at a scarce period) 1s. to 1s. 6d. per stone more than winter-fed, is a weighty reason for making it in summer. A stranger would be apt to conclude no stock were kept; but though there is very little grazing going on, a good many cows are fed, the only indication of which you see, when riding, is their stern ends visible through the doors of the homestead, which is generally included under one large wood building, embracing the house, barn (generally on the second story, approached by an earth incline), waggon-shed, cow-house, piggeries, &c. This construction is favourable for the collection of liquid manure into one cesspool, which, with the heap of manure, is usually placed within a few feet of the door of the house. Its contents are carted to the land in a long cask, placed in the railed waggon, when any produce requires to be brought home, as back carriage. This invisibility of live stock I noticed especially in a valley of Grindenwald, where Murray, in

* Paper read before the Lavenham Farmers' Club.

uide Book," says, thousands of cows . Probably some of them were grazing mountain sides high up. At Thurn, e gratified to hear the peculiar hum ngle kept up late at night, and early in rning, by the bells on the necks of the forming a large dairy which are not out at all at mid-day. Indoor feeding is mes pursued too far. At the University farm at Bonn, the sheep were huddled er in a barn-like building, with other Observing some Southdowns of some sions, I found they came from England. d but think if the ghost of Tom Crisp here, how he would shrug his shoulders pig-like treatment of his favourite lowns! Even here, where English far- had been successfully copied, I was ed to notice a gang of harrows with n teeth.

RIETY OF CROPS :—THE WORKING OF CATTLE.

e variety of crops grown in some parts rmany renders a ride through it very sting. For instance, within a few miles idelberg, I saw, with the exception of , nearly every crop required to clothe, and amuse mankind, embracing the the usual corn crops, potatoes, beet her sugar or not I could not discern), , rye, tobacco, the universal lucerne, clover, lupins, poppies, cole-seed, kohl and frequently flax and hemp. In erland, where money is decidedly scarce, im is evidently to render the occupier endent, by growing all he requires. omy prevades all their doings. As a nen, the naves of the wheels were in instances done up in straw or bad hay, event the sun's acting upon them. In elberg, I was amused at the agricultural ges. A cart, or any two-wheeled le was rarely seen. The light-railed on, whose buck here would cost about answered every purpose. When earth to be conveyed, a long bullock-like h was placed in it; when liquid manure, ong cask I before named. Most of had breaks attached, as the cows or cattle by which they were drawn are, I apprehend, not good at down-hill work. The pole, instead of shafts, did very well, except, as was frequently the case, when only one ox was used, then the whole set-out looked very awkward. Frequently cows in full milk were drawing them. This seems somewhat cruel, but I have no doubt the cow was much happier, and its produce more wholesome, than the London cow and its produce. Indeed, comparing its lot with many of those in this country, it appears in no way inferior. These worked cows were evidently well fed and cared for, both in kind usage, and in having their food prepared for them, and living in well-sheltered homes, whereas we here frequently see cows whose whole day is taken up in searching over meagre pastures in a hot broiling sun, for a necessary supply of food. Drawing waggons, I observed some good wide half-fat bullocks, which were evidently well-satisfied with their position in life. I think it is quite open to doubt whether we have not too much displaced cattle as beasts of burden. To be sure, where ploughing was being done by cows the soil was of a tender pliable nature. Indeed, I saw no land, excepting in France, compared to our heavy clay lands in the difficulty of cultivation. Were I a small farmer of light land, I should certainly consider whether the cow should not help the horse in ploughing it. The cattle were far better than the estimate I had previously formed of them.

MANAGEMENT OF MOUNTAIN DAIRIES.

Upon the top of the Rigi, one of the most known mountains in Switzerland, I saw a large dairy of very superior cows, fawn-coloured, with dark points, wide and short-legged, with apparently a good disposition to fatten. The management of the mountain dairies is as follows :—In spring they eat the grass from the low and frequently irrigated valley grounds, which produce three crops in a year. As summer advances, the cows are moved higher up, so that in the hottest period the highest grounds are fed, approached only by horse and cattle paths.

For a few months, the dairy itself, in many cases, is moved to near the top, and the cheese and butter are brought down by horse or hand, chiefly by the latter. As autumn advances the cows occupy a lower level. In the winter they are shedded in the valleys below, when I expect they have a hard time of it, for the extent of arable land is small, as well as of mowable grass, therefore the supply of roots, hay, and straw is very limited. For litter, leaves are collected and preserved. Hay is much thought of, collected by considerable labour, and is frequently carried a long distance down the mountain sides in nets, on the backs of men. Where there is much of it, you see numerous wood sheds for its reception, very like the cottages or chalets, with boards for roof, kept on my large pieces of rock placed upon them. I observed at nearly every homestead the sledges laid up, ready to be brought out in winter for conveyance of hay and fuel, &c. The scarcity of hay, and the difficulty of its carriage, have, I suppose, led to the plan of baiting horses | upon slices of coarse rye bread. Our coachman carried his with him, and very quickly baited his horses with it. It appeared to differ in appearance very little from the loaves strapped upon the backs of the Swiss soldiers we saw assembled at Zurich, It is extraordinary how, in high elevations, wheeled carriages are dispensed with. It seems surprising how an hotel, like that of Rigi, capable of accommodating 300 people, can be carried on when all its supplies, including, I think, the water, have to arrive from far below on the backs of men and horses.

AGRICULTURE IN THE BLACK FOREST.

In passing through the Black Forest, we saw agriculture in its primitive state, still, the splendid roads kept up by the Government had done a good deal to modernize the parts we passed through. In some districts, the roads, I believe, were self-supporting; as there were no toll-gates, this seems paradoxical. It is by the fruit trees which grow upon the narrow wastes by the sides, and which, from there being no hedges, seem to thrive, and they were carefully kept and renewed when necessary. Assuming an apple tree to be worth to rent 6d. a-year, and that one was planted on each side every 2 rods, there would be 320 to a mile, which at 6d. each would yield £8 a-year per mile. This probably might keep up the road, as the material is formed from the rocks adjoining, and labour is very cheap; still the boring and blasting of the rock is expensive.

THE LAW ABOUT SWANS.

IN a recent article, *Land and Water* supplies us with some curious and interesting matter about swans. Our contemporary says:—

"So long as a man keeps to land or water, where he has a right to go for shooting, there is no restriction against his killing any sort of wild-fowl, because they are not "game," and no license is imposed by the Excise statutes. There is, besides, no danger of his making a mistake, except in the instance of wild swans. But since he may fall into the error of killing a tame swan, thinking it to be a wild one, it may be useful, as well as interesting, to note the possibilities, as well as the consequences, of making such a mistake.

"The hooper, or wild swan, may be immediately distinguished from other species of swans by the character of its head; for, while the mute or common tame swan has an orange beak, with the peculiar tubercle or knob on the upper part of the beak, where it joins the feathers of the head, the hooper's head is without that peculiarity of beak, which is of a yellow colour, and becomes black towards the point. Besides this differ-

ence in appearance, the organ of voice will indicate the wild swan, and ought to be a sure guide to the sportsman. The mute or tame swans kept in the rivers of this country are all the property of the Crown, or some private individuals, or of some corporate bodies, such as the mayors and corporations of large cities, and the London companies. They used, in former times, to be protected by a very harsh law, for it was a felony to kill one, punishable by death. And even now they are the subject of larceny in public rivers if they are properly marked, and in private rivers or lakes, even if unmarked. But it is not every one who has the right to keep swans of his own on a public river. It is a privilege granted by royal charter to the owner of land, and the title to the grant descends with the land to his heirs or devisees. Every person who possesses the privilege has a peculiar mark, which is specified on the charter, and he claims the right of keeping swans by virtue of his swan mark.

"The right of keeping swans in private waters is not restricted to those only who have a grant of a swan mark, but those who do so must take care that the birds do not wander on other people's property; for, if they are caught or killed by any one on property where such person has a right to shoot, the owner will have no right to prosecute him criminally. There are, then, birds, *ferœ naturæ*, of which larceny cannot be committed. The true owner, we apprehend, cannot even recover in damages by civil action the value of a bird so killed, unless, perhaps, he can prove its identity by some undoubted mark of his own. And he would probably be put out of court by the plea that the bird was killed "*damage faisant*," land in order to protect the land of the shooter. We are not aware that any such action has been tried.

"If, on the other hand, a swan that has not been properly marked is at large on a public river, it probably may be killed by any person who has a right to shoot where it may be found, and it certainly may be killed in a private lake or river. But if a swan is improperly marked, that is to say, marked with no known peculiar mark specified in any charter of grant, it is still an open question whether the person who kills it, or has it in his possession, may or may not be convicted of larceny, or as a receiver. There is no case on record in the law books directly governing this question.

"Sometimes, though very rarely, the Crown, instead of granting a swan mark, has conferred a still greater privilege—namely, a right (within a certain district) of seizing white swans not marked. This right is called a game of swans. Thus the Abbot of Abbotsbury, in Dorsetshire, had a game of swans in the estuary formed by the Isle of Portland and the Chesil Bank. The privilege of swan mark, or game of swans, was, in the time of Edward IV., 1483, restricted to the king's sons, and those only who possessed a freehold of the clear yearly value of five marks. This grant of a right to kill unmarked swans, shews that such birds were not considered as the property of any person; for, if they had been, it would have been exceedingly arbitrary to have conferred on any person exclusively the right to take them. But it also served to make the owners of swan marks anxious to keep their proper birds marked. In the absence of any one having a game of swans, we apprehend that any owner of the bed of the river might kill unmarked swans within his own estate."

BREEDING OF HUNTERS, RIDING, AND TROOP HORSES.

WE copy the following excellent article from the *Sportsman*. It is written by our contemporary's "Special Commissioner," and few men know horses better than he does :—

While dealers and gentlemen are continually grumbling about the scarcity of good horses for the army and for ordinary purposes, there is abundance of material in the country for farmers and others to utilize for the production of almost any quantity of high-class animals for the road, the field, or the army. The great *desideratum* in horse-breeding for these purposes is a sufficient number of the right sort of mares, a few of which ought to be in the hands of every farmer, according to the extent of land he occupies and his knowledge of the subject. As a proof of the manner in which we waste our material for the production of good horses, we have only to consider the number of strong, short-legged, sound, and symmetrical mares, both thorough-breds and half-breds, that are *annually worked to death*, and never produce a foal. There is no reason whatever why a mare, after performing a fair amount of work, say, up to seven or eight years of age, when she may become partially or wholly useless from some disorder not of an *hereditary* character, should not be utilized for stud purposes up to twenty years of age and more. Some of our best and stoutest racehorses have been bred from mares who have been raced until they have become unsound from some disorder not likely to be transmitted to their progeny, and when they have attained an age at which they would—had they remained sound—have been entirely worthless either as racehorses or as hacks. Ferina, by Venison, was twenty-two years old when she produced Pretender, the Derby winner. Miss Ann was fifteen years old when she bred Scottish Chief, She is now twenty-five years old, and is breeding still. Marguerite, a mare in Count Lagrange's stud, has borne no fewer than twenty-one foals, and Financier, her two-year old colt by Ventre St Gris, was last week sold for 150 guineas at Tattersall's. There are numerous instances I could name of mares upwards of twenty years old having bred racehorses of very high class, and the majority of these thorough-bred matrons produce their best animals after they have become utterly useless for any other purpose. Why, then, cannot the thousands of mares now in ordinary use as hunters, troopers, and hacks, be put to the stud instead of being pole-axed when they are no longer useful? True it is, that great numbers of these mares are not adapted, through defective shape, hereditary unsoundness, and other causes for the stud, but good judges could easily select sufficient numbers every year to supply the country with the means of producing a greatly-increased quantity of useful horses for the purposes I have named. These mares would in some cases be thorough-bred, but a far greater proportion would be half-bred, and when put to stallions of full blood, with size, strength, soundness, and good symmetry, the produce would be, as regards breeding, the very thing desired. Then, with a liberal system of feeding when the animals are in a growing state we should have bone, substance, and weight-carrying power, combined with action, nervous energy, and endurance in our horses, which might be produced to an almost unlimited extent. As regards stallions, there are always a great number of big, strong, sound, and useful thorough-bred horses, which, having performed but moderately on the turf, through being too slow, are not fashionable enough for racing sires, and these could be bought at a price quite easy enough to pay the breeder. All that we require in England, Ireland, and Scotland is energy to set about the business of horse breeding, for it is idle to suppose that we are wanting in experience, capital, or the kind of land best adapted for the purpose; and as regards profit, I think there cannot be a doubt that, with proper management, such a system of horse breeding would pay better than either bullock grazing or sheep farming. Good horses of the class I have described are always in demand by English or foreign dealers, and the war has caused a dearth which it will take years to supply in the present state of the market. I am well acquainted with an Irish horsedealer who has for many years had an unlimited commission from the Germans to purchase the best mares he can find in Ireland, or elsewhere, of

rt likely to breed cavalry horses, and
aw, in 1861, upwards of a hundred shipped
ı from Dublin at one time. In the selec-
f the class of mares to which I allude,
attention should be paid to the feet.
s with small contracted feet are almost
; as either hunters or roadsters, and no
in the formation of mares is so certainly
ıitted to their offspring as badly-shaped
sordered feet. Strong and well-formed
ns, short cannon bones, with the sus-
y ligament and flexor tendons clean and
efined, knees large, and arms long and
muscle, are also essential points in the
on of brood stock for ordinary purposes.
ı, well-shaped head, with the ears short,
and lively looking clear eyes, with plenty
th over the face between them, a small
, clean throttle, and a strong muscular
free from coarseness and loose flesh, are
;reat recommendations. Then, if you
ınd strong, deep, and obliquely-formed
ers, with the withers high enough to
:he saddle in its proper place, plenty of
in the brisket, a strong back, well-arched
wide hips, muscular quarters and thighs,
ırge, well-shaped, and sound hocks, you
quire nothing but excellence of action and
m from hereditary diseases to secure the
ınd of mares possible to breed from. The
;ood points must also exist in the stallions,
en, on the principle that "like begets like,"
n hardly fail to produce the sort of horses
:mand for which will, for the next few
be almost unprecedented.

ıve said that in the selection of mares to
roadsters, hunters, troopers, &c., great
hould be taken that they are free from
tary diseases. Of these, defective vision
of the worst to be avoided, and as the
ry ophthalmia is the most common, and
dly hereditary, it is important that every
:r of horses, from the small farmer to the
:xtensive stud proprietor, should perfectly
ıtand the symptoms by which it may be
ed. When once a horse has been at-
with ophthalmia he is ever afterwards sub-
a recurrence of the disease, which too
:ventually causes total blindness. One of
st symptoms of ophthalmia—sometimes
"moon-blindness"—is great irritability on
ı exposure to the light on emerging from
ı stable, when the eyelids are partially

One of the eyes is mostly affected be-
e other, and on examining the diseased
d comparing it with the sound optic, the pupil is found to be more contracted. The attack is, in the first instance, frequently so sudden that it is sometimes mistaken for the result of accidental injury, such as a blow from a brutal groom, or a hay-seed having fallen into the eye. The lids are swelled and puckered, the eye weeping, and in almost all instances the pupil remains to some extent so much contracted that an experienced horseman has little difficulty in detecting a predisposition to the disorder, even though the animal may not at the time be suffering from its most acute stages. Horses most frequently "shy" from defective vision consequent on a peculiar natural formation of the eye, as well as from the effect of disease. In these cases the eye is so very prominent that the objects at which the horse is most commonly frightened are not correctly focussed, and instead of distinguishing them quickly and clearly, their exact form cannot be recognized by the animal at certain distances. The horse is consequently uncertain as to their outline, colours, &c., and becomes cautious and timid on approaching them, and too frequently the infliction of pain with whip or spur is associated with the first appearance of an object that cannot be properly distinguished. A horse with defective eyes is as incapable of seeing correctly as a person looking through a race glass wrongly focussed to his sight, and there are natural peculiarities of the eye—irrespective of disease—that are, comparatively speaking, as frequent in the human being, and it has been judicially decided that defective vision—even when not the result of disease—constitutes unsoundness. My object is, however, to make known the characteristics of the most common disorder to the eyes of horses—ophthalmia—as a warning that *mares* especially intended for breeding purposes affected with the disease should be avoided. Spavined and small curby-looking hocks, as also navicular disease and roaring, are serious impediments to mares afflicted with these disorders being used for breeding purposes; but any ordinary judge of horseflesh would have little difficulty in detecting such disorders, which are in most cases hereditary. Broken wind is, on the contrary, not so easy to discover if the purchaser has to negotiate with an unprincipled vendor, as these have recourse to many expedients for counteracting its principal symptoms. Indeed, the symptoms of this disorder can be much alleviated by attention to diet; and the temperature and quality of the air breathed have a great influence on the d r-
der. The most successful mode of disguising t

disease is, however, what is termed "setting" the horse, as well as dosing him. The animal is first well physicked, for the purpose of emptying the stomach and bowels. He is then kept from any hay, and not allowed water. Whatever food he gets is of the most nutritious kind in a small space, and on the morning of an expected examination and sale, some unprincipled "copers" will give him from 1 to 2 lb. of ordinary shot, which has the effect of assisting in steadying the flank, and others administer large quantities of bacon fat. By these means, assisted by keeping the animal in an open yard or shed, his breathing is generally tranquillized to such an extent that, to inexperienced persons, he appears to be not the least affected in his wind. One of the most effectual modes of causing the "double draw" of the flank to disappear, is to turn the animal out to grass, and to keep him there till the time he is offered for sale, as horses at grass seldom—no matter how badly they may be broken-winded—have any extraordinary flank action in their breathing. If, however, they are taken up and kept even an hour in a moderately warm stable, the breathing becomes most unmistakably laboured and suspicious. Whenever there is any doubt as to whether or not a horse is broken-winded, he should be placed for a day or two in a warm stable, and have as much hay as he can eat, and water constantly before him, and if he is suffering from this pulmonary disease, he will most assuredly shew the symptoms in a marked and unmistakable manner. To the experienced eye, however, there is always one symptom of broken wind which can be detected in spite of drugging, dieting, "setting," or anything else, and that is an unnatural dilation of the nostrils, which become expanded continuously from even the slightest exertion out of the common way. In concluding my remarks on this subject, I may, however, state that the purchase of horses by inexperienced person is always a hazardous, if not a vexatious, undertaking, and it is far better to employ a practical and conscientious man to effect the transfer of horse stock of any kind, but particularly for breeding purposes.

Farm Architecture.

FARM SERVANTS' COTTAGES.

By JOHN YOUNG, Architect, Civil Engineer, and Valuator, Perth.

IN the December number of THE COUNTRY GENTLEMAN'S MAGAZINE there were some remarks on the necessity of making better provision for the comfort of farm servants in the arrangement and capacity of their dwellings.

I take the liberty of sending a drawing shewing a plan of one of a range of four farm cottages, designed by me for the Glover Incorporation of Perth; and which were erected by them last summer on their estate of Seaside, in the Carse of Gowrie.

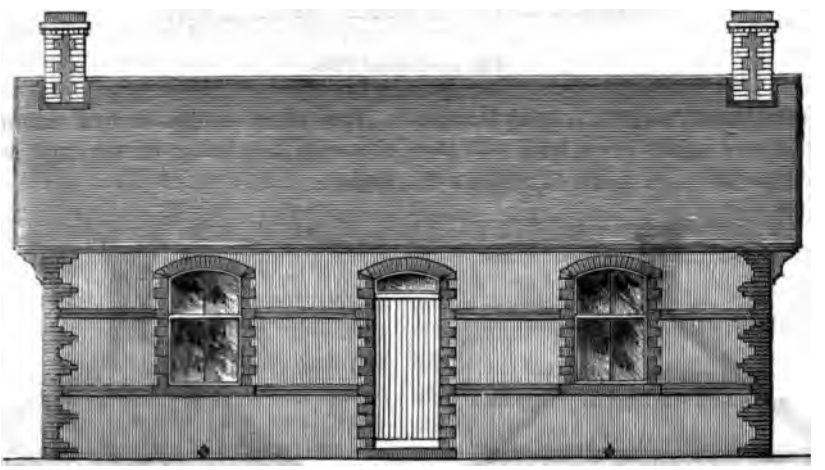


Fig. 1.—Front Elevation.

Each house consists of a kitchen, 13 feet by 12 feet, having an open recess in addition, at one corner between the scullery partition and the wall, of 6 feet 4 inches by 5 feet, for a bed-stead. A door from the kitchen enters into a scullery, 6 feet 6 inches by 4 feet 6 inches, in which there is a sink, and from the scullery a door leads out to the offices and garden at the back. At the opposite end of the house to the kitchen, there is a room, 17 feet by 15 feet, allowing room for two beds, if required, along the side of the wall. In the centre of the house there is another small bed-room, 9 feet by 7 feet. The house is entered from the front by a door leading into a lobby, 7 feet by 3 feet 6 inches. In the lobby, and in each room, there is a large press.

The Glovers have studied to provide houses in which the farm servants and their families on their estate can live with comfort, and in a manner somewhat in accordance with the spirit of the age. It will be seen, that where families are large, there is ample provision made for separating the sexes.

In front of each house there is a flower plot, fenced in by means of a neat paling, extending from the wall to the farm road, running parallel to the cottages, about 7 or 8 yards distant from them. In order to e

courage tidy and cleanly habits amongst the servants, the Glovers intend annually to award prizes to each cottager, in proportion to the degree of cleanliness, tidiness, and comfort exhibited by each. The cottages

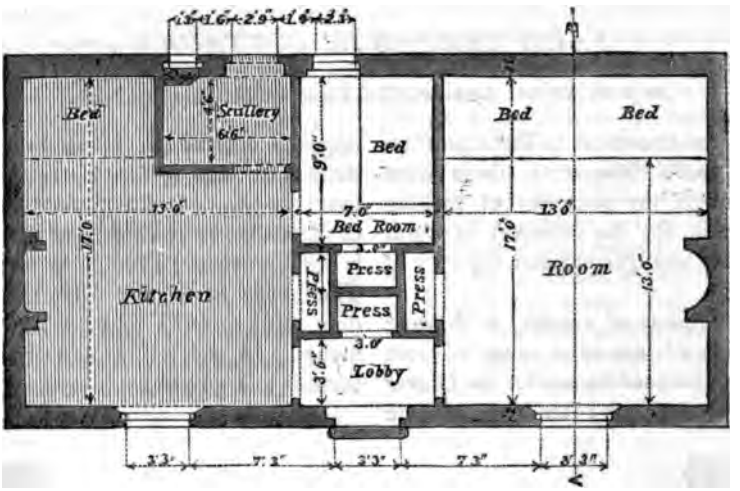


Fig. 2.—Ground Plan.

are built of red brick, with white brick facings. The walls are 12 inches thick, built with two walls of single brick, at 3 inches apart, with

The whole range of four cottages cost about £400, being at the rate of £100 each.

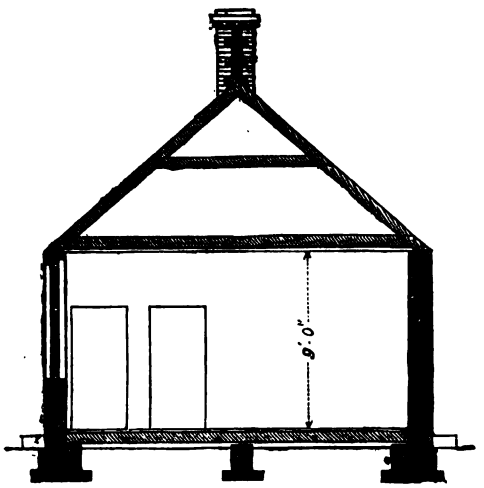


Fig. 3.—Section.

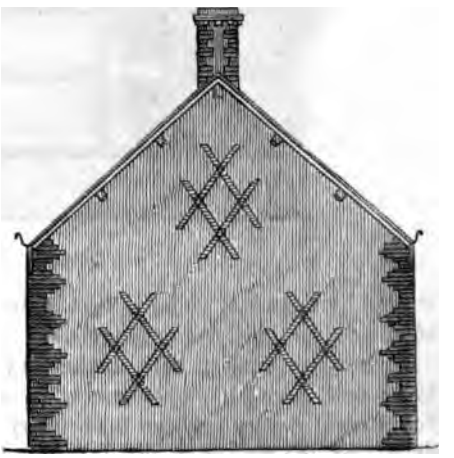


Fig. 4.—End Elevation.

12 inch besides, at certain distances, arranged so that no part, except where the couples rest at the top, shall be solid; but form a

The kitchen, lobby, and scullery floors are paved with flags, and the rooms have wooden floors.

FOUNDATIONS FOR FARM BUILDINGS.

ATTENTION to the condition of the soil upon which farm buildings are o be erected is not always given with the care which the importance of the subject demands; indeed, in some cases no attention is given to it at all, the buildings being put down at once upon a spot of ground which is deemed to be a good place, without any thought being given to the question as to whether the soil is a good one or not. We have had abundant evidence of this presented us; all the wonder is that it should be so in view of the important points noticed. For these do not comprise merely those connected with the stability of the buildings which are proposed to be raised upon it, but also points connected with the health of the human beings, or the animals, which they are designed to shelter. On this latter point, it is certainly surprising how little of the careful attention which it requires has been given to it. It is indeed only of late years that these notions have been acted upon, that the soil of the site of a house has an important influence on the health of the inhabitants; and this notion has not been as yet greatly developed or extended. We have said that it has only been of late that this attention—such as it is—has been given to the subject, but it would have been more correct had we said that the notion has only been revived of late, for antient authors were very fully impressed with it. In an article on "Cottages," a Roman author has remarked upon the choice of a site for buildings, and on the influence whether its soil were in a sanitary point of view, shewing that, as an architect, he deemed the subject of vastly greater importance than do many of the architects of our own day.

It is gratifying, however, to know that much greater attention is paid to this subject than has ever yet been the case in modern practice of building, and it is to a few of these most important points in connexion, that we propose, in this article, to draw the attention of the reader.

In the usual classification of soils, the best has generally been put down as gravel, the worst, close retentive clay, these being the extremes of the scale—all medium soils between them being comparatively good or bad, according as they approached the one extreme or the other. But recent researches have tended to modify very materially this classification. For example, it is stated, and the statement is based upon what appears to be indisputable evidence, that houses built upon gravelly soil are much more apt to be liable to the attacks of cholera than those built upon clay soil; but, at the same time, it is stated, that while clay soils do not appear to invite the attacks of cholera, they do invite the attacks of other diseases, as these are visited with pulmonary complaints, and the like—and this, we confess, we can quite understand. In the case of a gravelly site, if the sanitary arrangements are such that the liquid drainage matters are allowed to permeate the gravel, and lodge firmly at the base of the gravelly deposit, which, in many cases, will be found to be a close clay, then the exhalations which will arise through the gravel, especially in dry, warm weather, will be of a most unhealthy kind. It would thus appear that, so far as the sites of human habitations are concerned, there is left for the architect but a choice of evils; if he escape the Scylla of one disease, he enters into the Charybdis of another. All this, however, assumes that noxious matters are allowed to pass through and remain, at least, in close connexion with the soil of the site. If this were not allowed, we are inclined to think that the l classification of soils, which we e

stated above, would still stand good as a standard. At all events, notwithstanding the above facts—if facts they be—we would much rather have to deal with a gravelly than with a clayey soil. We could easily prevent noxious matters passing into the gravel; we should have a much greater difficulty in preventing the rise of damp in a clayey site.

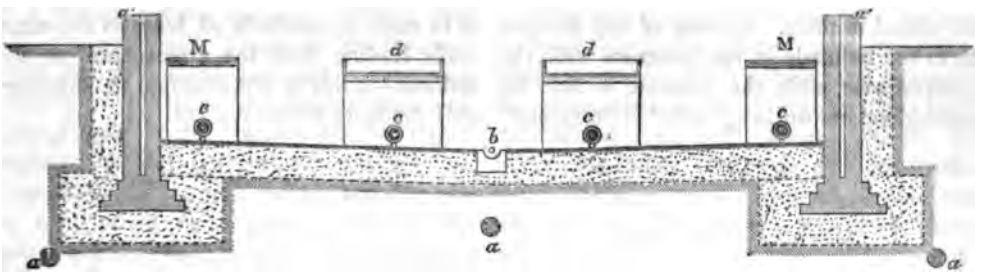
The construction of buildings in such a way as to prevent damp rising from the soil, and reaching to and spreading through the walls, is of immense importance in a sanitary point of view. For it may be taken as an acknowledged truth, that there is scarcely any cause of ill health and disease so certain, and yet so subtle, as damp in houses inhabited by human beings, as well as in the buildings designed for our farm stock. Various methods have been proposed to keep damp from the walls of a house; some of them more or less effective; and no less various have been the methods proposed by which to cure the complaint, that is, to get rid of damp after it has taken possession of walls. But in this, as in other things, prevention is better than cure, and prevention of a perfect kind may be divided into two branches—first, treatment of the soil or site upon which the walls are raised; and second, the mode of building the walls themselves.

Under the first head comes the essential of thorough drainage of the soil of the house, this being done in the same manner, as regards details, as agricultural or farm land is drained, with this difference, that it is more completely done. The site may either be surrounded by a deep drain, which falls into the main drain, or in addition to this incline of drain tubes, others should cross the plot from side to side and be pretty close together, and be provided with a good fall. The choice of the site itself is also of importance. Some buildings are placed in such positions as if the object were to catch as much water in the site as possible. If placed at the foot of a slope, great care will be required in the drainage of the site. In such a case, in addition to the drain tubes surrounding or crossing the actual site, we should recommend a catch drain of considerable depth, to be placed at the upper side of the site, and parallel to its breadth; this drain, filled with stones up to within 1 foot of the ground level, it will be all the better if this catch drain be returned at the ends, so as to reach some distance down the ends of the site. If the building is necessitated to be placed so far up the slope as to require the land to be trenched out, forming a bank at the back, or if a house be already placed in this the worst of positions, then still greater care will be necessary to prepare the site, since the catch drain will be essentially necessary. An excellent means to secure dryness in the apartments of a dwelling-house is to cellar it wholly or partially under; the cellar room thus obtained will be found very useful for storage purposes, much of which is required in a farm or rural house. If the expense of cellars be objected to, the ground floor should be raised above the surrounding soil at least a height of three steps. This will be a double advantage, for it will admit of the perfect ventilation of the space below the floors, and thus prevent the dry rot attacking the timbers. Still further to secure dryness, especially in close, clayey, retentive soils, the soil all over the space enclosed by the walls should be dug out to the depth of at least 1 foot, and the space filled up with, first, a layer of stone shivers, and, second, a layer of smithy clinkers or cinders, well and carefully rammed down. Better still, if the space under the floor, or the floor of the cellar apartments (if cellars be made), be concreted with Portland cement concrete.

Under the second head—namely, the construction of the walls themselves—a variety of plans might be here named, such as a layer of substances placed on the course a little above the ground level, such as coal-tar, cement, slates, asphalted felt, sheet lead, or flat tiles. But by far the most effective method is, we believe, the filling of the foundation trenches to a considerable depth with concrete, of which that made with Portland cement is the best. But this plan will be still more effective, and may, indeed, be re-

ied upon as almost practically perfect, if the concrete is brought out for a considerable distance beyond the breadth of the walls, and then returned so as to come up to the level of the ground on each side of the wall. This plan, as illustrated in the engraving, shews the section of the lower part of a dairy, which of all the buildings of the farm requires to be freest from damp. This illustration is given here, as it also shews the method of forming the floor in concrete. The upper or floor surface is here shewn to be of tiles, but we prefer the whole to be of Portland cement concrete, than which we believe nothing is better for the formation of all kinds of floors of farm buildings.

The formation of concrete floors as recommended above to be used, is a comparatively simple operation. The surface formed



Section of the Lower Part of a Dairy.

by a concrete made in the way about to be described, is smooth, perfectly uniform, free from all cracks or indentations, thus affording no space into which dirt or wet can insinuate themselves, and therefore, peculiarly well adapted for dairies, such as illustrated in the figure, although no less so in buildings where farm stock are kept, or in the working rooms by the farm house or cottage, as the scullery and washhouse. The cement used is what is termed as "Portland," it should weigh from 105 lb. to 112 lb. the bushel, and should be rejected as poor in quality if within 100 lb. to the bushel. The "base" used with cement to form the floor surface may be made of a variety of substances, as crushed bricks or stone, sand or small gravel. Where there is much tear and wear upon the floor, and especially where animals are to walk over it, the crushed brick should be used, although for many purposes sand will be available; river sand or pit sand is better than sea sand. If gravel be used, it must be very small, and even then it forms a rougher surface than in some cases would be deemed desirable. The brick is crushed into a fine condition by being pressed between two iron rollers, fine "breeze" from iron works will also form a good material for making a "base."

The first thing to be done is to dig out the floor space to a uniform depth of 6 inches below the line of finished floor level. This space is to be filled up to a depth of 4 inches with broken stones or road metal—the stones of size sufficient to pass through a ring of 1¾ or 2 inches. This layer of stones should be spread uniformly over the surface, so as to be level throughout. If, however, the floor is to slope from one side to another—a form best adapted for cow-houses or stables—or to slope from the centre to the sides—or *vice versa*, as in the case of a dairy, as in the figure; then the layer of stones should be finished over on the upper surface, so as roughly to assume the form which the finished floor is to take. Before putting in the stones, the bottom of the excavated space should be well rammed over, so as to consolidate the whole surface, and prevent any sinking of the stones. The concrete forming the floor surface is now ready to be laid on, and this is prepared as follows:—Measure out three parts of the "base" in crushed bricks or sand, and one part, mix them well up together, adding as much water as will make the whole heap of such a consistency as to enable the material

to be spread evenly and uniformly over the stones. Too much should not be made at one time, as it is apt to "set." A little experience will enable the workmen to spread it uniformly over the stones, and to finish the surface smoothly with the level, or the slope intended to be given to it. The laying should be commenced at one end of the space to be covered, and the whole worked gradually to the other end, so that no passing over the surface laid would be necessary till the whole is thoroughly hardened, and should passing over the newly laid surface be necessary, boards should be laid down, on which the workmen should walk. Under favourable circumstances the surface should be hard enough in forty-eight hours to be walked on without injury, although in the case of stables, &c., a week should be given for the concrete to harden before the animals be placed in them. Gutters of any size and form can be made in the concrete with the greatest ease while the concrete is soft, by imbedding and working "sets" in "template" of timber, the under side of which is rounded off to the desired curve of the gutter, the thickness of the template determines the width of the gutter, and the depth will be easily adjusted by hewn fillets, nailed on each side of the template at any desired distance from its lower edge, which forms the bottom of the gutter. When the concrete has been laid for some time, but while still softish, the corners of the gutters should be rounded off, as sharp angles will soon be snapped or broken off.

An excellent method of preventing damp from passing from the external walls to the internal surfaces, and places much exposed to certain winds, is to build the walls hollow, as in the figure. The hollows should not be made wide, as the rats are apt to get into the stones. Another point we would draw attention to in the formation of hollow walls, is to make up carefully all holes in the outer walls leading from the atmosphere to the hollows—if this is not attended to, considerable draughts will be created.

Agricultural Engineering.

ABOUT REAPING MACHINES.

the reaping of cereal and grass crops, a greater change has been effected recent years than in any other branch bandry. Upon the toothed, or smooth- sickle, the scythe, with or without s, was a wonderful improvement, and mechanical reaper a tremendous stride rance of each. Practically, the reaping ine made its first appearance at the Exhibition of 1851, though, a-quarter century before, the Rev. Patrick Bell cut corn with a similar contrivance. that time, there has been a surprising nt of ingenuity and capital employed details in the construction of these ments, and perfectibility has not yet reached. In this article, however, we ot intend to suggest novelties—the facturers' capital and the inventor's will doubtless, in time, find out an gement by which a self-acting reaper, is now called, will be made to make an sheaf in all kinds of corn, instead of, present, putting the sheaves down, or small, according to the weight of op. All we wish to do is to deal with we have already in the market, and ome indication to intending purchasers their merits. In passing, we might say hose who want machines cannot order on. They run the risk of disappoint- if they delay until the immediate ap h of the season.

have what may be described as four of reapers, manual back-delivery ines, self-acting side-deliverers, self- back-deliverers, and swathers. The al back-delivery reaper has received attention, and has been sold in numbers than any other form, and perhaps, for several reasons. It has been longer in the field than any other (always excepting Bell's, which never achieved any great position as regards numbers sold); it is less expensive, and the person delivering the sheaf can make it of a uniform size—a feat which, as mentioned above, cannot be achieved by any form of self-delivery reaper; and, as a rule, it is less complicated and more easily kept in order than the others, and is generally of lighter draught.

Self-raking reapers have now been in use for more than half a score of years, and have, upon the whole, given satisfaction, although the price, particularly at first, was too high to admit of their being generally used. It has certainly one advantage over the back-delivery reaper—a whole field may be cut without lifting one sheaf. Doubtless some will say that this is no advantage, but rather the reverse, as the fact that with the back-delivery reaper the sheaves *must* be removed before the reaper returns, and in this way you may get more work out of the harvest labourer. But in our own experience we have found that this is not the case, and that a labourer will, with greater ease and in a shorter time, lift a sheaf deposited by a side-sheafer than by a back-delivery reaper. During harvest, when the grain all over a farm becomes simultaneously ripe, the side-sheafer becomes a most valuable implement. And this, of course, equally applies to swathing machines.

The self-back-delivery reaper is a comparative novelty in most districts, although extensively used in two or three of the Scottish midland counties. Indeed, in these it has displaced, to a large extent, the other self-delivery reapers. It has one advantage over other reapers, viz., that one man sitting on the machine, and driv

the horses, can thoroughly attend to the cutter and rake the ground gone over by the machine in each successive round. But it has several disadvantages, one is, that the work performed by it is very irregular. Where the crop is thick and a little grassy, it does well, but where thin-set, it leaves a large quantity of straggling straws, and lays down the sheaf in a ragged manner on the ground. It is also complicated, and the whole weight of the delivery gearing being hung from the one side, gives it a very unsteady motion. It cannot be used on a hillside, as the weight of the driver would overturn it. It is, on the whole, very easy of draught.

Our remarks upon the side self-delivery reaper cover, in a great measure, all that we can say in favour of or against swathing reapers. This class of machines, however, has one recommendation over the others. It has been found very useful in the barley-growing districts, inasmuch as to give that fine mellow colour so much run after by brewers, it is desirable to leave the grain a day or two in the swathe. But laying the crop in swathes entails a large amount of labour in gathering it into sheaves, which the self-side-delivery machine obviates.

The old Bell principle of propelling the machine has its advantages also; the machine can go into a field cutting its own way, which no other can. Were our opinion asked as to the best kind of reaper, we should say a self-sheaving side-deliverer, where the crop was equal; a back manual-deliverer, where the nature of the soil produces an irregular growth.

ADVANTAGES OF PULPING AND STRAW-CUTTING MACHINES.

By Mr Frederick Long.*

MR LONG, after ransacking history with reference to the mechanical contrivances for cutting hay and pulping turnips, remarked upon the

ADVANTAGES OF THE PULPING AND MIXED SYSTEM.

He said, What are claimed as the merits of the pulping and mixing system? The principal is—it economizes the roots, for after being pulped and mixed with the chaff either from thrashing or cut hay or straw, the whole is consumed without waste, the animals not being able to separate the chaff from the pulped roots, as is the case when the roots are merely sliced by the common cutter, neither do they waste the fodder, as when given without being cut. By economizing roots they last longer into the season—a most important consideration on all larger stock farms. Inferior hay or straw may be used. After being mixed with the pulp for about twelve hours, fermentation commences, and this soon renders the most mouldy hay palatable, and animals eat with avidity that which they would otherwise reject. This fermentation softens the straw, makes it more palatable, and puts it in a state to assimilate more readily with the other food. In this respect the pulper is of great value, particularly upon corn farms, where large crops of straw are grown, and where there in a limited acreage of pasture, as by its use the pastures may be grazed, the expensive process of hay-making reduced, and consequently an increased number of cattle kept. The masticatory process is materially abridged, and animals are enabled to fill themselves sooner, and return to a state of repose, and digestion is easier. The condition of the animals is better, they are more free from disease than under any other system of feeding. Scouring is entirely avoided. There is a

* Paper read before the Framlingham Farmers' Club.

ving in the consumption of hay. may with safety be used much ı the season if required. Steamed ı a great measure rendered unneces- reby saving coals as well as avoiding what objectionable smell and trouble teaming apparatus. Choking is an ility, the roots are entirely consumed, ast pieces left in the feeding troughs. e as well as these many other advan- recommend the pulping and mixing

FEEDING OF HORSES.

ling horses with pulped roots, pro- may be varied to suit the time of l the work they have to do. One n tells me he has kept his horses in rough the winter by giving them oots, with equal quantities of straw haff, allowing each horse a little hay lb. of corn meal during the week, a saving of half the corn and hay he iously given. Another says he gives l of pulped root to 2 bushels of aff, mixed fresh every day with ½ f cracked beans, and a little hay for . Another gives 20 lb. of pulped ı plenty of chaff, two-thirds straw, hay. Another says that horses do re hay; the pulped mangold induces eat a quantity of chaff. He carries to the stable in a cask directly it is after mixing with the chaff and , the mangers are filled at night. eral report is—horses eat the mixture dity, it allays their thirst, and fre- prevents colic and inflammation, ten turns out fatally, from the animals n excess of cold water on an empty

Aged horses are kept in better ı on the mixture; horses will not y food when feeding on pulped food; tate of their health is much improved. and carrots for horses are liked very hen pulped. Most agree that the oot is best for horses when fresh nd all, that a considerable saving in takes place. Colts thrive well on ed mixture.

BULLOCKS, COWS, ETC.

In the case of bullocks, the method of feeding varies; one says—"I take the two-and-a-half-year old steers, I cut for them chaff about five-sixths straw, one-sixth hay, and sometimes nothing but straw; with this I give them about 2 pecks of pulped mangold per day during the early part of the winter, and as spring approaches increase the quantity until they get up to 4 pecks per day; I mixed the pulped roots with the chaff upon the floor of the chaff-house, and use the food thus mixed before it ferments. The oilcake and other artificial food I give separately." Another writes—"I consider the pulped roots good for all live-stock, more especially for those in which we suppose the digestive organs are weakened from exposure or other causes; the proportions must vary in all cases according to the quantity and quality of the fodder, chaff, roots, &c., the farmer has in hand. I find in practice it is best to mix the roots immediately after pulping with chaff, throw the whole into a heap to allow the chaff to soak up the juices, and the whole mass to slightly ferment. In twenty-four hours it will be in the best condition to use, that is to say, mix up the quantity required for the day ensuing. I usually give the cake, corn, &c., apart from the mixture." Another says—"I fatted some bullocks last year with pulped mangold and cut clover, and mixed one day before giving it to the beasts, and then mixed bean and barley meal with it at the time of feeding. I found them fat quicker than those fed on sliced mangold, hay, and meal." All agree that, whether fatting or store stock, the animals thrive well on the mixture, are fond of it, keep healthy, get fat quicker, and are not so much trouble. For cows, pulping answers well. One large cowkeeper says—"I use pulp fresh every morning, making enough to last twenty-four hours; as it falls from the trough of the machine it is taken to two large boxes or troughs standing in the middle passage of the cow-house; in one it was mixed with cut hay, and in the other with cut straw. Cows giving milk had the former, dry cows the latter. The orders of the cow-man are to feed every animal accord-

ing to its appetite, that is, to give it as much as it will eat up clean, five times in twenty-four hours, when they are housed night and day, also to proportion the pulp and cut stuff (hay and straw) according to the state of the dung of each beast; by attention to this latter order, I find it is quite easy to prevent either scouring, or the opposite. Milking and fatting beasts had two dry feeds out of five, consisting of cut hay and meal only. I deem it much preferable to give beasts a little and often, rather than very large feeds at a time, except when left for the night, when they get as much as their troughs will hold. I have no racks for uncut fodder for the cows. On this system all the stock was kept in fine health and condition, suitable to stores, milkers, or feeders, with, as near as I can judge, an economy of hay and roots; but particularly of the former, of about one-third, as compared with the old system of sliced roots and long hay, besides avoiding all risk of choking. My young stock are fed the same as the cows in milk, there being no danger of making them too fresh, as might be the case with cows about to calve. I house my dairy stock from about 1st November to 1st May. The quantity and quality of milk they give on being turned out to their pastures at the latter date, depends entirely upon their condition, and I have no hesitation in saying that no stock could possibly have been in better order than mine was in May, very far exceeding that of the majority of my neighbours, as evinced by the quantity of curd to each cow, viz., 4 lb. per twenty-four hours, on a yield of 18 quarts of milk per cow." Another farmer says—"As regards the use of the pulper for cattle generally, irrespective of age, my plan is to have a layer of cut chaff, consisting of three parts hay and one of straw, and 1 bushel of pulped mangold or turnips, and to repeat the quantities until sufficient is obtained for next day's consumption, allowing it to remain about twelve hours to ferment. The stock are then fed on it thrice a-day, with sufficient to satisfy them. Last winter I left off giving my dairy cows the mixture, as previously named, substituting mangold sliced by a turnip cutter, and dry chaff. The result was a deficiency of above 1 lb. of butter each cow. I then reverted to my previous plan, and I found they produced the same quantity as before." It is generally agreed by all who have tested it, that the pulped mixture not only improves the quality of the milk, but it also does away with that unpleasant flavour of the turnips in the butter, usually attempted to be got rid of by using saltpetre in the making. The improved milk also produces a better quality of both butter and cheese. Less mastication being needed, it is a great consideration in the case of young cattle casting their teeth, and old ones who have but few. It is an old saying "that the milk comes from the cow's mouth," so the pulping must be an advantage in saving the cow's front teeth, which must suffer from the chipping of the whole turnips; the dairy-farmer cannot be too careful of this, so that when he has a good cow, to keep her for a number of years. The mixture being of a soft nature suits the mouths of calves, and they quickly take to it.

SHEEP.

A great number may be kept on the same occupation. In pulping the roots it is generally considered necessary to clean the roots well to prevent scouring in sheep. A gentleman says—"Having an unusually heavy crop of straw, and my turnips having partially failed, I resolved, as I wished to increase my stock of breeding ewes, on testing the pulping system and try how far, by cutting up my wheat straw and by pulping my turnips, I might acquire the end I had in view. The system I pursued was of mixing about half turnip-pulp and half chaff the day before using. My expectations were fully realized; my former flock of ewes was from 80 to 90, and last year I kept on the same land 140 to 150, and at lambing time they were in as nice condition as I could wish, and were particularly healthy, having consumed no more turnips than my flock of 80 or 90 had done in previous years. Ewes will also suckle well on the food, and lambs will eat it much sooner than food otherwise prepared.

PIGS.

methods for these are most simple. ensive pig breeder says—"I find lvantage in mixing the barley meal : roots when pulped. The manner I se of the roots is this, First have oroughly cleaned and washed before then pulp and put in a large close cistern, mixing a little barley-meal before it is given to the pigs. The :e to each pig is 1 peck of barley- :r week for the first three months, nuch mangold or swede as they will ter that I increase the barley-meal y for the next three months, up to per week for each pig. By such ıt I make many of them weigh from ; stone each." Another gentleman sues the method adds—"I prefer this ıny other I have seen, and I reckon k can be made fifteen per cent. than by meal alone; and the pro- feeding being slower, it certainly large quantity of manure." Another I consider pulping roots is better for ; pigs than anything else. My plan e a large two-hogshead vat as near ing machine as possible, so as to fill ı malt shovel as it comes from the , at the same time I keep a lad g meal (either barley or Indian th the roots, and this is all done in : twenty minutes. It is then ready :o be carried to the pigs. I never t a pig with profit until I used oots." Where potatoes are given hey are boiled in less time if passed the pulper. An experiment was Essex by a gentleman who had 1500 of diseased potatoes. They were p, and put down in a shed, where sphere was kept from them, and at of five months they were as good as

FOWLS.

y are amazingly fond of the pulped :y surround it and eat it greedily. hus gone through the various classes that pulped food is beneficial for every description of animal, I would here remark that some deal has both been written and said on the system of fermentation. If hay or straw is at all tainted, then fermentation will remove the objectionable taste. The time for the fermentation must depend on the state of the weather, position of the place, for admitting air at the time. Straw, by this method of feeding, comes round into manure much quicker. Straw that has undergone the fermented storing plan may be mixed with the roots, and after lying sufficient time together to allow the straw becoming moistened, may be given to the animals with great advantage. If time permitted I could give the results of many experiments that have been carried out on farms. I will mention one. Two lots of year-old cattle were fed, the one in the usual way—sliced turnips and straw *ad libitum*; the other with minced turnips, mixed with cut straw. The first lot consumed 8 lb. sliced turnips, 1 lb. oil cake, 1 lb. rape cake, and ½ lb. bean mean, broken small, and mixed with a little salt, and what straw they liked; the second lot ate daily 50 lb. minced turnips, 1 lb. oil cake, 1 lb. rape cake, ½ lb. bean meal, and a little salt, the whole being mixed with double the bulk of cut straw or wheat chaff. In the spring, the lot of cattle which had the mixed food were in as good condition, and equally well-grown as the others, though they had consumed in five months 2 ton less of roots a-piece. I will conclude with a quotation from the Prize Essay of Mr Wm. Little, published in the Royal Agricultural *Journal*, on the "Management of Cattle." He says—"We introduced the pulper in the autumn of the year. For the first season we only fed a part of our number of cattle with pulped turnips and cut chaff, to test the value of the system as against the usual plan of feeding with sliced roots. The result shewed, firstly, a decided economy from the use of pulped food; and, secondly, that the cattle so fed were, if not better, at least equal in quality to those fed on the old plan. From actual experiment, we find that by giving each beast 10 lb. of cut straw mixed with the pulped roots, there is a sav-

ing of 21 lb. of turnips per day on each animal. Two lots of eight each were set apart for the experiment. Those on sliced roots consumed, on the average, 8 imperial stones per day, with 8 lb. each of oat straw out of the racks uncut. They had what they would eat of both. The other lot had a mixture of cut straw and pulped turnips, what they would eat, with oat straw, uncut, *ad libitum*, and consumed, on the average, 6½ stones of pulped roots, and 10 lb. of cut straw, with 4½ lb. long straw per day each beast. We now pulp for sixty-three cattle, and estimating the saving of roots at 1½ stone each per day, we save about 4 tons 2 cwts. per week on the average, and above 106 tons during the half-year, equivalent to 3½ acres, at 30 tons per acre. Perhaps some might effect, by a larger admixture of straw with the pulped roots, a far greater saving than that stated, without bias, as the result of our experience, and with which we are satisfied. Those who object to so considerable an admixture of straw should bear in mind that the stomach of the ox is fitted for a large amount of bulky food, not necessarily all of a very nutritious kind. This must be filled before he lies down to ruminate contentedly. He can and will eat as much of rich food as of the comparatively innutritious sort, but not with an equally good effect. His system cannot assimilate more than a moderate quantity of the flesh or fat forming substances contained in rich food, and, consequently, it becomes overloaded and irritated, so that scouring is produced, especially at the first. All who are acquainted with the feeding of cattle know that when first put upon turnips, as many as they can eat, they for a considerable time get worse in condition instead of improving. This is particularly the case with cattle low in condition, and could be entirely avoided by the judicious use of the pulper; besides, the argument for its use at first applies with no less force to its general adoption. Although the cattle with which we have to do are seldom low in condition, still we consider it a duty to economize, as much as we can, the available food for live stock as a means of increasing the number of our cattle, and, consequently, the supply of beef for the public. The demand for beef and mutton is not met by a corresponding supply, let us then welcome every means which can help us to grow more food or economize its consumption.

The Farm.

THE GROWTH OF CABBAGE AND KINDRED CROPS.

By Mr C. Cadle.*

M afraid the subject I have to introluce to your notice this evening is not teresting as many that engage your on in this room, still it is one of conble importance, and one that has not ed sufficient attention from agricul- . It has never received any special by the members of your Club, gh many gentlemen have more or less d to it in the papers introduced by It is also a subject that has not ed its share of notice in the Royal :ultural Society's *Journal;* it has, howbeen noticed by the following gentle- The Earl of Lovelace, vol. v., p. 112; [ugh Raynbird, in his prize report on urming of Suffolk, vol. viii., p. 276; Mr Sewell Read, in his prize report on the ng of Oxfordshire; Dr Voelcker (who, : way, has done more for farmers and rn farming than any other man in .nd); Mr C. Lawrence, of Cirencester; Mr John Chambers, in the second of the Royal Agricultural *Journal,* vol. 376. These gentlemen have only d upon cabbage as a general crop, and them allude more particularly to the head or ox cabbage; but my principal : this evening will be to shew its advanas a summer crop; not that there will ich that is new to the members of this but that, by the expression of your ons in the discussion, it may be brought prominently before the farmers of nd, and receive more attention than it at present. The value of cabbage was ht more prominently under my notice last summer from the fact that, as far as my observation went, those who had a good stock were enabled to get through such a critical season with far less serious consequences than those with none. I will point out—1st, Its advantages as a summer crop; 2d, The different methods of planting and cultivating it; 3d, The time and mode of consuming it.

THE ADVANTAGES OF CABBAGE AS A SUMMER CROP.

Before entering upon this, we ought, perhaps, first to discuss how the crop can be produced, and at what cost; but I purposely place this first in order to shew that, whatever the cost, cabbage should be grown. On the generality of farms the end of May is a critical time in the management of grazing land, for if sufficient stock is not kept to prevent the grass getting long, the stock do not care to graze it afterwards (especially the pastures on the lighter soils, where a quantity of couch grass is often mixed with the other herbage), preferring the bare places; and thus the grass on a portion of the land is left over for winter. I admit this may be obviated by mowing a portion of this old grass each day, but this is not often done. The difficulty the grazier has to contend with is to have sufficient stock to keep the grass down, and at the same time not to over-stock, and so not to have enough food to keep the animals in a progressive state. It is at this period, therefore, that the farmer needs to be prepared with some early cabbage, so as to be able to distribute a cartful or so each day amongst the stock upon these pastures, : thus be enabled to meet the above c

* ıper read before the Farmers' Club.

gency. Very often drought sets in, and the grazier gets so hard up for food in June, July, and August, that he is compelled to sell at a great sacrifice in consequence of shortness of keep, when a few acres of early cabbage would have prevented such a sacrifice. To the sheep farmer it is perhaps of still greater importance, as the clover crop has of late years been such a precarious one that he is often put to his wits' ends to know what to do with his stock so as to keep them in a progressive state, and in this case a load or two of cabbage per day when the feed runs short is invaluable. In the case of his lambs, we all know that to rear sheep profitably they should maintain the fat made from their mother's milk, or, in other words, be kept in a progressive state, for a check in the growth of a young animal not only undoes the work of weeks, but it often takes months to get the animal back into a thriving state, besides the question of loss of life, often very great with this kind of stock in October and November, the mischief being done in August and September, when a liberal allowance of cabbage and artificial food would be a preventive of all these evils, as cabbage is one of the finest things you can possibly get for lambs. Another profitable use to which cabbage may be applied as a summer crop is for fatting cattle in the stalls during the summer. Mr Anthony Bubb, of Witcombe Court, near Gloucester (who has for thirty years kept his stalls full in the summer as well as in winter), tells me that the cattle feed much faster tied r. during the summer than they would out grazing, as they are not exposed either to the heat of the sun by day, the cold nights which often occur, or the torment of flies, either of which causes may be the means of the beast losing the fat it has been days in acquiring, and is consequently so much loss of food to the farmer, while his difficulty is to keep them on when, from drought or other causes, a deficiency arises in the supply of green food. He tells me he has never tried cabbage, but it appears to me that a few acres of Enfield Market or other early cabbage just meets the difficulty; for there is no doubt cattle fed under cover in the summer require much less food to produce the same amount of fat than when they have to roam about and have the labour of finding it for themselves—especially is this the case with large beasts, upon which the labour of gathering its own food tells so much more than upon small ones. I would also commend the practice of stall-feeding to the advocates of the factory system of cheese-making; for a cow will give much more milk if her food is brought to her ready prepared, than she will if she has the labour of getting it for herself. I believe that, with the aid of cabbage, that system will introduce cheese and butter-making into arable districts, with great advantage, too, upon the lighter class of soil, where the greater portion of the roots grown must be eaten on the land, for then instead of the farmer buying cattle simply to tread straw in the winter months, he would be able to make it into manure during the summer, and in a far more profitable manner.

THE PLANTING AND CULTIVATION.

The greatest difficulty in getting a crop of cabbage is to get a stock of good plants, as the seed requires to be planted at a time when the farmer is very busy, and both the ordering the seed and the sowing it is too apt to be forgotten. The best plan is to order the seed of your seedsman in the spring with the other seeds, and prepare a quarter or half an acre of land, in a corner well sheltered from the north and east winds, and on July 20, sow one-fourth, and the other three-fourths at intervals of a week between each planting, so as to use every precaution against accidents of weather and vermin. As soon as the plants come up, they require to be noticed, to prevent their being destroyed by the turnip fly or slugs: they should be moderately thick, as they are like young larch trees, and nurse each other up while they are young; at the same time, if planted too thick they get too tender and too long in the stem. In the beginning of October, the land intended to be planted with cabbage should be well-worked, if possible sub-soiled, and manured both with farm-yard and arti-

manure; for the cabbage plant is a gross
: and cannot well be over-manured, as
eight per acre may often be doubled
no extra expense except the manure.
plants then should be set out in rows, 24
' inches apart, the latter distance being
rable, so as to leave room for horse-
ıg between the rows. The plants are
set with a setting-pin, 12 inches apart, in
·ows. This should be done when the
is moderately dry, otherwise the pin is
o leave the soil caked in the hole, espe-
' on some soils. The plant is then put
d the earth pressed to the roots, so as
p the entire hole, otherwise a hollow is
ınder the plant very prejudicial in dry
ıer. Care must be taken that the root
ıe plant is not doubled up in putting it
the hole, although some little doubt is
tained whether this is of much consee,
ce, for one gentleman told me he found
with his man for not being more careful,
the man said it did not matter, as the
roots would spring out above this. He
ed some to see if it was so, and could
ınd any difference between those put in
ght and those with the root doubled up.
e weather is very dry, it is sometimes
able to water the plants in the bed, as
draw so much better, and the small
ıs roots do not get broken off. I know
gentleman near Ross, who has been a
:ssful grower for many years, and who
ıis set out at 6d. per 1000, a man plant-
000 per day; but I have never been
myself to get this done. The planter
get on much better by having a boy to
the plants to him as he requires them.
ıey will have to be horse-hoed, it is neces-
to have the rows planted straight, and
may be done by the use of a line, or
pieces of cord, or a band may be put
l the roll at the requisite distances,
omething put to drag behind the
ws, care being taken to go straight; but
est plan is to put the coulters of the
drill the requisite width, and run it over
land. Another, but more expensive
, is to set them in every third furrow,
taking care that the horses do not tread
on them. They may be set with a spade
or a hoe, the trenches being first opened
with a plough. When planted out with
the rows 2 feet apart, and at a distance
of 1 foot from each other, it will take, in
round numbers, 21,000 plants to the acre.
These, if bought at 3s. 6d. per 1000, will
cost £3, 13s. 6d., and 6d. per 1000 for
planting out, will make £4, or, to be on the
safe side, say 9d. per 1000, which will make
the cost £4, 8s. 3d.; but as the whole cost
of the plants if grown at home would only
be about 10s., as 1 lb. of seed at 4s. will
raise sufficient plants for 1 acre, and say 9d.
for planting, the cost in this case would only
be £1, 6s. per acre. To this we should
have to add cultivation of the land, say 30s.;
rent, rates, and taxes, say £2; horse-hoeing,
8s.; and manure, £2; making a total of
£7, 4s. per acre, besides farm-yard manure,
which must be supplied liberally; and if you
can grow 30 tons to the acre you get a most
valuable stock of food at less than 5s. per
ton, and where is the man that is not willing
to give double this sum for all he can get?
Another mode of planting that I have tried,
and also seen tried, is to drill the seed as
you would turnips or swedes, and fill in any
gaps from the places where the plants are
thick; by this means you also get a quantity
of plants to sell to your neighbours, if you
draw the plants by hand to the requisite
thickness. I have never been successful
with this system, and do not think it answers
so well as the transplanting, for, in the first
place, you have no land in July without sac-
rificing a crop of turnips or swedes; and in
the next, the plant while young does not
seem to thrive on the ridge; but I must
admit I have never tried drilling on the
flat, by doing which, no doubt, the plant is
more protected than on the ridge, while in a
tender state. On the other hand, in Octo-
ber, you can plant after a corn crop, and it is
a poor crop of turnips or swedes that is not
worth the cost of planting out the cabbage
plants—viz., 15s. 9d. per acre, and, I be-
lieve, the crop is better when transplanted.

TIME AND MODE OF CONSUMPTION.

As I have already explained, the greatest advantage of growing cabbage is for the purpose of helping out other crops, and it should be ready to begin upon by the end of May, being used as required during June, July, and August. The cabbages should be cut off with a knife, leaving the three lower leaves on the stem, these being then cut off separately and taken away with the cabbage; this will allow the stem to shoot out, and you get a second crop in September and October, which comes in very useful for the lambs, if not required for any other stock. Should the cabbage be cut off the stem below the leaves, they do not sprout out so well, and often not at all; therefore the man who cuts the cabbage requires to be looked after to prevent his cutting them too low, as to cut them low is only half the trouble of cutting the cabbage, and then the leaves separately. This system of keeping for a second crop, I consider the most profitable, but they are sometimes grown and consumed by being carted off, or by sheep upon the ground, and the land is afterwards ploughed up and planted with rape or turnips. I have also seen beans grown amongst the cabbages with advantage, the crop in this case being sold for market in May, before the beans get very high; then the stems sprout again, and the beans are out of the way in the beginning of August, so as to allow of the second crop of cabbage coming to advantage. Some persons make a very profitable mode of consumption by selling them off early in May, when I have known them sold at the rate of £40 per acre, as at this season of the year most kinds of greens are getting scarce. The ox or Drumhead cabbage is generally grown in a different manner from that already described, the seed being planted in the spring, and the plants set out in May or June, coming to a crop in October and November, and upon clay and heavy land they make a valuable crop, especially on soils that do not grow turnips and swedes well, as they come in for the sheep till nearly Christmas, and even kept for ewes and lambs in the spring; and the stock generally thrives upon them. When grown in this way they take the place of a portion of the turnip crop in the rotation, and are eaten off in time to plant the land with wheat, and I have seen fields of 40 or 50 acres planted with it. About one plant per yard is thick enough, if the land is in good condition and suitable for growing them of great size. The ox cabbage is not so nutritious a food as the smaller and earlier sorts, still, as a crop, they are valuable, and with a little attention may be grown with profit in all sorts of odd corners of the farm.

GENERAL REMARKS.

Cabbage is unquestionably one of the most nutritious of green crops, as will be seen by the following analysis and remarks by Dr Voelcker, in vol. iv. of the Bath and West of England *Journal*, on the Chemistry of Food:—

Water	86.28
Flesh-forming substances	4.75
Heat and fat-producing substances...	7.10
Inorganic matters (ash)	1.87
	100.00

It will be seen by this that the per-centage of flesh-forming substances is nearly three times as much as in common turnips, and is equal to almost all our clovers and grasses, and hence the avidity with which it is devoured by young growing animals such as lambs, and by its producing so much milk, and I will mention this to shew its superiority as a summer crop over clovers and other grasses, for, if you grow double or treble the weight per acre, at only a slightly increased cost, and get a crop more available for being given to stock, in consequence of its not ripening all at once, as is the case with green crops, it gives cabbage a great advantage, and entitles it to take a more prominent place on our farms. Dr Voelcker remarks:—"Indeed, no kind of green food cultivated on a large scale in the field contains so much nutritious matter as cabbage. Being much more nutritious, weight for weight, than turnips, and at the same

time very succulent, cabbages form a valuable food for milch cows. Cattle are very fond of cabbage, and dairy cows fed upon it and some hay produce much and rich milk; and the butter made from the latter is free from the disagreeable flavour which it always has when cows are fed upon turnips. Cabbages for this reason are a valuable substitute for turnips, and deserve to be more extensively cultivated in England than at present."

Mr Cadle then proceeded to read to the Club letters from experienced farmers on the subject. The general opinion expressed was that, as a cattle food, and a market commodity, cabbages were highly remunerative, and deserved a more extended cultivation.

KOHL RABI.

Kohl rabi is a variety of cabbage that I will just mention in order to give any member who has had any experience of its growth an opportunity of giving us the benefit of that experience. For myself, I have never grown any, and they do not seem to command so much favour in the west and north as in the east and south, and this is probably accounted for, in some measure, by the fact that it is a plant that delights in dry weather, so that a climate with only half the quantity of rain we get seems best adapted for it. This accounts for the fine specimens to be seen last autumn at our agricultural shows. It seems to be well adapted for the heavy retentive class of soils better than the turnip, as the bulb being above the ground the nature of the soil does not interfere with its extending in size. It is planted and cultivated much in the same way as the ox cabbage; but where grown in large quantities it is drilled direct on the land in the beginning or middle of April, and singled out to the requisite width when of sufficient size. It appears a very suitable crop for transplanting after vetches, peas, or early potatoes, and for filling up gaps in mangolds and swede rows.

TOP-DRESSING FOR CROPS AND PASTURE LANDS.

By Professor Buckman.*

WITH regard to the subject of manures, the question of importance to be ascertained respecting the soil is—"What is it in any crop we may take away from that soil? What is it we take away?" They had not only to ask this question in respect to one crop in particular, but with regard to the next crop, because the succession of crops depended upon the fact that one crop would take one thing and one another. It was therefore of importance that agriculturists should understand the principles of chemistry in order to apply them to the cultivation of the soil. At the present time these matters were so generally recognized that it seemed trite on his part to direct their attention to them, but he thought it necessary to point out some facts connected with special manures. Now, there was a question which was always brought before one in every shape and form in farming, and that was the question of using manures or making manures by sheep feeding. Now, with regard to sheep feeding upon land, what did agriculturists do? As a general rule, sheep were placed upon pasture land, probably during the greater part of the day, and folded upon arable at night, the farmer saying that the land could not be bad and that nothing was lost from it because sheep made manure. He was quite sure no gentleman present believed that sheep made anything upon land they did not find there. If they had lived all day upon the grass of the field, and nothing else, and if they voided tl

* Paper read before the Dorchester Farmers' Club.

exuviæ over that field, and if they made nothing fresh over it; or if it happened, as was often done, that the arable robbed the pasture—that the sheep were put upon pasture by day that they might drop over the arable at night—it was very clear indeed that they must make the pasture poorer, and enrich the arable. But because they feed upon the pasture in that meadow, people were apt to think that they must leave that meadow richer than they found it. It was, however, impossible to make new material without bringing in something. This was a matter for consideration, and it was one of great importance.

USE OF MARL.

He would now touch on another point. Marl was constantly used in manuring in former times, much more considerably than at present. This marl was usually understood to consist of clay with a certain amount—5 or 10 per cent.—of lime. About sixty years ago it was generally recommended as a manure, and he had seen it stated that the farmer who, if he had marl upon his premises and did not use it, must be next to mad. What was the consequence? All though the Midland counties —Gloucestershire with its lias clays, Worcestershire with its clays of the new red sandstone, and indeed everywhere where there was a clay which contained a large per-centage of lime—that clay was tapped for the purpose of marling. Even now there were holes with trees growing around them, and these trees shewed holes of fifty or sixty years of age; but now the holes were abandoned for drinking ponds for cattle. At one time thousands of pounds were expended upon making these enormous holes, many of which were large enough for ornamental water. Why had they been abandoned? It was a curious question, and one that only chemistry could answer. If we went into the chalky district we found that marl had been constantly used on the top of chalk. Why was this? How could we account for it? Here, in one place, were marls of various kinds considered good and fatty, and which were used by the thousand loads, and yet the use of them had been abandoned in one part of the country, while the use of chalk marl had extended in another part. Chemistry explained this, and pointed out a very important principle. If they examined the lias, new red sandstone, and the silurian formation, they would be found to obtain clay and lime, but nothing else; but when they came to the chalky materials, there at the bottom they found deposited and stored up, as phosphatic matter, the remains and exuviæ of animals long since passed away. What was the reason that the marls in the chalk formation should be so useful? In Wilts, there are thousands and thousands of loads put on land, and yet the fatty marls are not employed at all. Why should one be found so useless, and the other a fertilizer? The marls we now employ so abundantly and so usefully have the exuviæ and the bones of animals in them. So that the whole thing resolves into this. If we eat portions of animals and vegetables—and we may call the more solid materials bone in both—they will contain those phosphatic materials which are so necessary; and so, again, with the bones and exuviæ of animals; they left behind those remains which are almost as important for fertilizing agents, as if they were recently deposited.

GUANO.

We were all aware of the facts connected with guano. It was deposited on certain rocks in Peru and different parts of the world, and on inquiry we should find that it consisted of nothing but the dung or exuviæ of penguins. These birds were found by hundreds of thousands upon the rocks. They feed on fishes, and leave the more solid materials behind. The great principle connected with guano was, as with all chemical manures, that it was not so much a matter of ammonia. He believed he should be borne out by all good chemists in the remark that manures were not good merely in proportion as they smelt, though his men, if they could get something that smelt tolerably well to put upon the land, considered they were doing well. Thus the manure makers were

:d to do something with the phosphatic res for the express purpose of making smell, in order to satisfy the farmers. 'act was, these stinking manures were of :e at all. It was on such simple matters :ne phosphates, soda, and potash, that 'alue of manure would depend. We be quite sure that just in proportion as ıse these materials from our farm-yard , we must supply them from foreign :es, in order to restore fertility to the

We have tapped all the sources of phate in this country, and we are now g all the guano from the rocks in Peru elsewhere, so that ultimately this will be usted. With respect to guano, it ap- ; extraordinary there should be such a , but if we examine any hydrographic we shall find that in places where there : least amount of rain, the penguins de- the guano, which is never washed away, thus it is we can now call upon these s. As far as guano, bones, and farm- dung were concerned, the meeting were aware that all these would be good just roportion to the amount of phosphate other chemical matters contained in ı.

VALUE OF FARM-YARD MANURE.

ith respect to farm-yard manure, there a time when farmers were glad to take in :s and feed them on straw for the purpose onverting it into manure. This was a useless and unprofitable process for any er to adopt. His own opinion was that ıld scarcely pay for the amount of trouble loyed in looking after their neighbours' ts ; for this reason, that straw does not ain that amount of manurial matter which quired. Let them give their beasts some , cake, or something containing manurial er, for if straw was only worth 12s. per ıs manure it was very little money to get idering the trouble that was experienced :cting it; but if no manurial material : added, the straw could not be very pro- le to return to the fields without corn cake. If they sold the corn from the v, they must do something to restore fertility to the land. If they had a thousand animals and fed them on nothing but straw, and after making so many thousand loads of manure by it, put it back from whence they took it, they did not render the field so fertile as it was before, because they took away the corn; therefore merely returning the straw contributed very little towards restoring the proportion of manurial material that had been removed. It was folly for farmers to suppose that cows made manure in addition to the straw. They did nothing of the kind. There might be some secretions from the animals, but this could not be separated from the water they drank, and this was one of those principles connected with the subject of manure which the club would do well to discuss. It was just that principle of what was the origin of manure? He knew very well, that as a rule, people made great mistakes upon that point. Landlords made mistakes and farmers as well. The landlord made a great mistake in saying that the latter should not do anything with his straw, whilst the tenant thought he satisfied his landlord if he took away the corn, leaving the straw behind. If he (Mr Buckman) were a landlord, the tenant who did that kind of thing would very little suit him, as his farm would soon get out of order. If, however, he bought manure and fed upon his corn, using those substances which would add to the manurial matter contained in the straw, he (Mr Buckman) conceived that would be a tenant worth having, and it was only upon such a system as that, that a farm could be made to pay, whilst it would only be made poorer and poorer if a different principle was pursued. A landlord should not say to his tenant, "You shall not sell the straw;" whilst the tenant should maintain that straw, or whatever he could get from the land, was just as much his right as anything else on the farm, always provided that his object was to do himself as much good as he could, and to keep the farm in proper order. He was certain that if a farmer did this, he would not leave his landlord anything the worse off when he left the farm than when he to it, and he was sure a recognition of th pr

ciples would leave it a great deal better than it was before. He would now say a few words with regard to farm-yard manure. He had not said anything to point out the effect of farm-yard manure as one of the most useful manures which could be used, and it was just as useful in proportion as its composition was varied and the food varied. It was useful, not in proportion to the number of animals which could be put on the farm, and giving them merely straw, but according as something was added to that straw.

STABLE MANURE.

So, again, with regard to stable manure. Some kind friends in the town would frequently say to the farmer, "If you will send me some straw you shall have my manure." That was a system of which he had always fought shy. Those gentlemen who had gardens possessed knowledge enough to know that in straw manure all the best could be kept behind. A town gardener was not so particular as a farmer about his weeds. He threw all his weeds upon the manure heap, and he must say that, from his own experience, manures from hotels and from town gardens had, generally speaking, been failures. The manure from hotels was made from hay and corn, and the great object which hay-dealers had was to make as much hay off the ground as they could. The result was that they foolishly left it so late that the hay was almost gone to seed, so that there was a great bulk of hay, but generally of a very coarse kind. This was sold off; but it left weeds behind, and was a source of docks and weeds to the farmer, just as weeds were placed from the garden into the manure heap and the best manure was left behind. There was very little profit got from sending straw into a town. It had to be carted into the town and brought back as manure, so that it was a system he did not care about. He believed that, so far as farmers were concerned in ridding towns of their refuse, they ought not to be called upon to pay anything like the price asked, and especially for straw manure. One would be prepared to pay something, but it occurred to him that to pay towns to get rid of their refuse matter was generally a great mistake. If towns were willing to pay something towards it, they might get rid of a great quantity of matter which is now poisonous to them. He hoped the time would come when, instead of every one's excrementitious matter being mixed up with 20 gallons of water, which rendered it too bulky for the purpose of any farmer, people would be careful that these materials were worth something, and that all real excrement was carefully preserved and kept on a system something analogous to that which has been so ingeniously pointed out by Mr Moule, and that the water and other waste refuse of that kind will not find its way into some streams. If ever that practice was adopted, farmers would be capable of dealing with that description of manure.

HOW MEADOWS ARE MADE POOR.

One expected to take hay from his meadow once-a-year, and some even twice; at any rate, farmers thought themselves extremely liberal to their meadows if they only took hay from their meadow once in two years. What was the return? He had taken some pains in going over several rich agricultural districts, where he had found that within the memory of man not one scrap or atom of manure had been returned to the meadows, and people were astonished that the land, which was so rich in the time of their grandfathers, had now become so poor. It was, however, a matter easy of comprehension. Every animal fed on these meadows, and every bit of cheese made from them, had taken away a quantity of bone, for the animals' bones themselves contained a great quantity of phosphatic matter. Butter takes away less bone than the commoner cheese (the true *caseine*), although people supposed it was not the case. It was not the taking away the butter, but the mineral matter that made the field poorer. The taking away a quantity of hay removed a large per-centage of phosphatic matter, and thus it was quite clear that unless something were done by

restoration they were injuring the field ıking it poorer. The matter resolved nto the important fact, if the plant ıs manurial matters which were being ıtly taken by the plants from the earth, l knew perfectly well that there would ıe loss, and that they could not grow ıtity of plants upon the same meadow ınd again without returning what they ut. They paid their rent just in pro- ı as the soil was naturally rich or poor. one looked at the country, and found ents ranged from 7s. 6d. to £5 per ıe must conclude there is some reason ıese two extremes. What was the nce? As a general rule, it was to take consideration if the land had been ly drained, but the real difference was amount of bones, phosphatic matter, ıalts as soda, potash, and alkalies, the ıay contain, so that they knew that in aturally fertile and naturally rich they not be obliged to incur such an ex- ıre as where the land was poor. He believed that some people in order to get a crop were obliged to put into the land all the material from which the crops were made. They created a system of manufacture, just as the manufacture of articles which required raw materials to be worked up into a new form. The more of this raw material plants take away, the poorer they made the soil, unless they took something back. The grand object of the chemist should be to explain what the plant takes out of the soil, and to ascertain how best and cheapest he can restore those materials which the plants have taken away. Thus they would see how important it was that this principle should be recognized, and when they considered that the principle of action was this that the exuviæ of animals and the more solid matters of the plant were so many materials taken out of the earth, by which the earth was impoverished, it became necessary that these materials should be returned again in order to restore fertilization.

IMPROVEMENT OF MEADOW AND PASTURE LAND.

By Mr Longman.*

IE large extent of land which is under pasture grass makes it a point of no mportance to ascertain the best modes roving it, and rendering it profitable to ıximum degree. The poor condition of rbage in too many districts shews that has yet to be done in improving the which yield it.

ORTANCE OF DRAINAGE, AND HOW TO DRAIN.

ıe begin by improving our wet land, ıg is of essential service to pasture land, ıally heavy land. Where it is thoroughly out it secures that degree of porosity soil which is best calculated to improve its productiveness, a natural result of the neglect of drainage being the rise and maintenance of poor aquatic innutritious grasses. These, on the land being drained, will disappear, and at first sight reduce the value of the pastures; but the loss is only apparent, for the growth can be well made up by sowing renovating mixtures of the finest grasses. Now, for draining strong clay lands, drains should not be more than from 20 feet to 24 feet apart; and I think from 3 feet to 3½ feet quite deep enough for land of that description. But if land has a gravelly or sandy subsoil, you may go 4 feet or even deeper, and increase the width between in proportion. As there can be no uniform rule laid down as to depth and distance of drain, the subsoil varying

* ıer read before the Winfrith Farmers' Club.

very much, this point must be left to the discretion of the drainer. But we must not be led away by the theory of book drainers, who tell us if we drain deep, we may drain wide apart in any soil. I have known drains put in 4½ feet deep, and 12 yards apart, in strong clay land, and in two or three years after, when the clay got close over the drains they were of very little use indeed. However deep we drain in clay land, we must not go too wide apart. In draining strong clay land, I should recommend the clay thrown out to remain for some days to the exposure of the sun and wind, which would cause small fissures to form in the lumps, as well as in the sides of the drains, which would admit the water more freely when filled in. I have known drains work very satisfactorily in clay land, by cutting the first sod the same width as the bottom of the drain, and put immediately on the pipes, the grass side being downwards. I should recommend a considerable length of drain to be taken out, where the soil would admit, before filled in, so that the drainer may see that he has a uniform depth to lay the pipes in their proper places. In taking out short spaces, and filling in again, I do not think the work can be done so effectually. There are various opinions as to which way the drains should be cut in the land. I do not suggest either as being the best, as sometimes you may, by cutting a few drains across the upper end of a field, dry nearly the whole of it. As regards the size of the pipes used, a 2½-inch pipe would be sufficient for some land, but where the land is of a sandy nature larger pipes should be used. In all cases, the principal or carrier drain should be large enough to take the water quickly to the empt, to allow the small or feeding drains to empt quickly. It is highly recommended by experienced drainers to put in air drains where convenient, allowing the upper end of the drain to lead into a ditch or some other open space to admit the air, by which the drains will empt more freely, and consequently the land will get dry more quickly. Care should be taken to make some mark at the end of each drain, to see they are not choked up. Draining does only benefit the land by making it dryer, but by rendering it more porous, so as to allow the rain water to filter through the soil, and leave behind it the gases and nutritious qualities which it contains.

WATER MEADOWS.

Water meadow is the cheapest land to improve, as the water brings fertillizing properties with it, which save the expense of artificial manure, also the cartage of farm-yard manure. But this above all other grass-land should be kept dry, except when you turn the water over it. If it is capable of getting dry as soon as the hatches are drawn out, the water will do twice as much good when it comes over it again. If it is necessary to drain water meadows, you should be careful that the soil be pressed firm in the drains after the pipes are put in, otherwise the water will run in at the top, work down the small earth into the pipes, and stop them up. They should not be watered the following year after draining, but time may be allowed the drains to get firm on the top, when the water will flow over as before. We all know that for a meadow to water well it should be thrown up in narrow beds, so that the water may run swiftly over it, otherwise it will not do half the good, but produce a rough coarse grass. The water that comes from chalky springs is the best, but this is only obtainable in certain districts. The next best is the thick flood-water from the rivers, but that which comes from the heath I think of little use. We should be particular to get the first floods at autumn over our meadows if possible, as the water is then much fuller of manure than afterwards.

HOW TO IMPROVE GRASS LANDS.

As, however, water meadows are only possible in certain localities, we must endeavour to improve our other grass lands. Doing this we all know is a difficulty, because we seem to want all the yard manure that we can get for the arable land, as that will bring a quicker, but I should not say a surer return. To manure strong and heavy land, chalk is a good dressing at the rate of from 30 to 40 tons per acre. It will not only fertilize the soil but will last a number of years. If that

ainable by reason of distance, lime substitute, at the rate of about three oads per acre, mixed up with the of ditches, earth by the roadside, scrapings, all of which are good or heavy land; or if the lime is applied state, in heaps of about a bushel, and o bushels to the acre, and spread s soon as pulverized, it will answer a pose. To manure light soils, the out of mud ponds, ditches, rivers, or y compost mixed with yard dung, l dressing. Where the herbage is d coarse, salt at about 5 cwt. per n broadcast, is recommended. In rts of Somerset they use marl—a fatty clay—which has an excellent a manure put on the land in the ıner as we use chalk in our chalky and about the same quantity per rying according to circumstances. think artificial manures, such as bone guano, are used so much in this as a dressing for pastures as in In Staffordshire, a large producing f butter and cheese and cattle, they use a large quantity of bones to he fertilizing qualities taken away. g to a prize essay in the Highland *Transactions*, bearing on the use ue of artificial manure as a top- for pastures, it recommends for ls guano, sulphate of ammonia, nitrate and soot, as a good dressing. On s, compost of earth, bone dust, cattle lt, seaweed, and fish refuse, are the table, and generally have an excellent Should all these fail to make good e, then certainly it ought to be l up. Not that we can be at all ıat if so treated it would be the first this or that piece of land has been by the plough. Thousands of meadows and pastures are producing half the quantity of hay and feed e land is capable of, owing to a y of the grasses which are most pro- nd most suitable for the soil. In some ıere the pastures are very foul with weeds and moss, it is advisable to pare and burn the whole sward, and resow the land entirely; but in most cases great improvement can be effected by merely sowing renovating seeds, which should consist of the finest and most nutritive kind of perennial grasses and clover, in the following manner:—Heavy harrows should be drawn over the old turf early in spring, to loosen the soil for the admission of the seeds, which, if sown freely, will occupy the numerous small spaces between the grasses already growing, and supersede the coarse grasses and noxious weeds. It is a good practice to sow these seeds at the same time as the top-dressing, if any is applied; but this is by no means necessary. The months of February, March, and April are recommended for sowing the seeds—the earlier the better, as the old grass will protect the young from frost. It is also useful to sow in July and August, immediately after carrying the hay. Should the old turf be very full of moss, this is generally an indication that draining would be beneficial. The following is, however, an almost infallible remedy for the moss, not only destroying it, but preventing the growth in future:—Mix two cartloads of quick-lime with eight cartloads of good light loam, turning the compost several times, that it may be well mixed and the lime well slacked; spread this quantity per acre over the pasture dragging the turf well with harrows. In sowing the seeds, choose a fine day, when the land is tolerably dry, but when there are indications of approaching rain; these are much more favourable conditions for the seeds to fall on the land than rainy or showery weather, as they are more likely to be evenly covered, and will be very gradually absorbing moisture from the soil previous to the fall of rain, which they will then be in a condition to receive with benefit, whereas if sown after a shower, which is frequently done, these advantages are not obtained, but the seeds having become saturated with moisture, and the dry weather returns, they are often malted. Cattle should not be allowed to graze during the same season, or at least not till after one crop of hay has been taken from it.

ADULTERATION OF GUANO AND RAPE.

DR VOELCKER'S Quarterly Report to the Royal Agricultural Society of England is, as usual, interesting and instructive, and certainly does not fail in either respect in that portion of it regarding the adulteration of manures. Although the number of samples sent has been fewer than in some of the other quarters of the year, the cases of adulteration are neither few nor of a trivial character. First on the list is a case from Essex, where Mr Catchpool, Faring Bury, Kelvedon, asked to value a certain kind of manure sent, as in comparison with Peruvian guano, and the manure was found to be of the following composition:—

*Moisture	9.65
Organic matter	13.54
Phosphate of lime	4.99
Carbonate and sulphate of lime ...	48.77
Alkaline salts and magnesia (principally common salt)	3.22
Insoluble siliceous matter (sand) ...	19.82
	10,000
*Containing nitrogen...	1.12
Equal to ammonia	1.36

which Dr Voelcker considers would be dear at £2 per ton in relation to the price at which Peruvian guano is sold. Dr Voelcker has made inquiries with respect to the vendor of this manure, and the price, but has not as yet received an answer. This is, doubtless, one of these cases deserving exposure, and it will be a great pity if the Society are not supplied with the information required by Dr Voelcker. The price paid by the farmer for manures of this stamp is only a very small part of the loss that is certainly to follow by the inferiority of the crop.

Dr Voelcker calls attention to an analysis of four samples of bone manure, shewing the great difference in the quality and value of different samples. These samples are numbered 1, 2, 3, 4, and he says:—"Assuming No. 3 to cost £8 per ton, the comparative money value of these four samples would be, No. 1, £5 a-ton; No. 2, £6, 15s.; No. 3, £8; and No. 4, £6, 6s. a-ton." Dr Voelcker afterwards learned from Mr Leather, Delamere Lodge, Northwich—the gentleman who used the manures—that the actual prices were, No. 1, £6, 7s. 6d.; No. 2, £6, 15s.; No. 3, £8; and No. 4, £6, 5s. No. 1, 3, and 4 were supplied by Mr J. Ashworth, Frodeham, and No. 2 by the Runcorn Bone Works. It is fair, however, to add that Mr Ashworth has, through Mr Leather, supplied another sample of No. 1, to the first sent, which contained much water and sand, with the explanation, that the sample analyzed was taken from "sweepings."

A sample of guano was sent from Mr Samuel Fitton, Cheerbrock Farm, Nantwich, who states that he bought the guano from Messrs W. Shaw & Co., Liverpool, at £14, 10s. per ton, delivered at a station near Nantwich (less 5 per cent. for cash), guaranteed pure. The guano was found much adulterated, and not worth more than £8, 14s. per ton. Explanation is made by R. Oakes, in the employment of Messrs Shaw & Co., that *Upper* Peruvian had been sent instead of Peruvian, and asking to return it. This was done, and Mr Fitton has received pure Peruvian guano, in place of the so-called *Upper* Peruvian.

The learned chemist is very particular in his report to inform all parties who are buyers of Peruvian guano, that the quality is much deteriorated, containing a large proportion of stones and rock; he gives an analysis of genuine guano, containing only about two-thirds the amount of ammonia which Peruvian guano of fair average quality used to contain. He also suggests that as Guanape guano varies to a greater extent than Peruvian guano, it should be sold by guaranteed analysis, and we quite agree with the doctor. If the agriculturists of this country would only look to their own interests by joining together to try and obtain this object, there is little

that the Peruvian Government would o dispose of their manure in the same :r as other parties, getting only for it certained chemical value, in place of ; it sold at a uniform price, whatever position.

In feeding-stuffs there has been nothing particular to state, with the single exception that a sample of rape-cake has been largely contaminated with wild mustard-seed, which, in one instance, did serious damage to cattle which were fed upon it.

ARTIFICIAL FEEDING-STUFFS.

IERE is something in the general saying that in all trades and professions there attempt made to hasten to get rich, at pense of the ignorance or over-confi- of the less better informed portion of opulace; in a word, the unscruplous acturer outwits, or, at all events, tries to , his customer, and unfortunately does ntly succeed in doing so.

Voelcker's quarterly report to the Royal ltural Society of England, to which ice was made last week, bears out this. rofessor gives a case of a cake sold as e, and marked "W. H., Genuine," he found to be adulterated with earth- ce, and to be of the following compo- —

isture	9.20
	9.90
uminous compounds (flesh-forming matters	26.18
cilage, sugar, and digestible fibre..	30.84
ody fibre (cellunose)	17.36
ieral matter (ash)	6.52
	100.00
taining nitrogen..	4.19

s. 6d. per ton was the price at which *uine* cake was sold, and it was manu- l at Hull, by William Holt, who explains : term "genuine" as a trade mark is lerstood to signify a pure cake. We ned up Webster, and find that genuine "not adulterated;" but Mr Holt e allowed to explain the difference 1 "pure" and "genuine cake," he t when these brands were first intro- duced, the former was made from the finest seed imported, and the latter from a secondary or inferior growth. It is a pity for Mr Holt, that in the case referred to the genuine cake was not only made from secondary or inferior seed, but was also "fortified" with earth-nut cake. We quite agree with Mr Winchester, the purchaser, when he states, in his reply, that "no trade usage can justify an adulterated article being sold as genuine." In two other cases, where cakes were sold as pure, they were found to be adulterated—one with oat dust and the other with earth-nut cake and beech-nut—came under Dr Voelcker's notice, but "the Committee think that the evidence in these instances, though sufficiently convincing, might not have the requisite legal force to warrant the publication of the names of the vendors." This is to be regretted, as the only way to get at the root of this crying evil is to expose in every possible way the names of the parties who lend themselves to such dishonest practices, because such actions tell not alone against the consummer, but also against the honest trader. The latter is either beaten out of the market, or his profits reduced to a minimun. Farmers have been and still are much to blame for the present state of affairs, in this wise, that they prefer running the risk of being cheated, to bearing the expense of having their samples analyzed. The outlay of having all samples of feeding stuffs purchased by a farmer analyzed, would no doubt prove a serious item if individually undertaken. But why should not a few neighbours join, and making a common purchase, get it analyzed

for their mutual benefit? We know of several instances where, as it were, a co-operative society was established for obtaining manures, feeding stuffs, and seeds. These societies have turned out very successful. The members have bought cheaper, and they run less risk of adulteration of their material; the seller well knowing science will be called to the aid of the buyer to prove whether he has been fairly dealt with or not.

MR W. HOPE ON SEWAGE FARMING.

AT a recent meeting of a Farmers' Club, near Liverpool, Mr W. Hope — who has been so successful as a cultivator by the utilization of the sewage of Romford — gave his experience of sewage farming. He said :—

As there is no sewage farm in the whole country, except my own, laid out in the manner which I believe to be the only proper mode of utilizing sewage by irrigation, if I decline to assist any town with anything but vague abstract information, if I refuse, in short, to assist them to put into practice the laws and rules which I recommend them to follow, I shall run the risk of still seeing sewage farms spring up, injudiciously chosen as respects site, inadequately proportioned to the population, improperly laid out, and improperly cultivated; and no one is more ready to admit than I am, that a sewage farm, under such conditions, may be at times an abominable nuisance to its immediate neighbours, may very imperfectly purify the effluent water, and may even possibly become a danger to health, although this latter possibility has, as a matter of fact, never yet arisen even from the worst state of affairs. The application that I have had the pleasure to receive from some of your representatives is not the first application of this sort that has been made to me, and I feel that I must adopt a decided course one way or the other. I propose, therefore, at the next meeting of the re-appointed committee of the British Association to put the matter fairly and fully before them, and ask them to give me a reply on the two following points:—First, whether, as a member of the committee, I ought to give any assistance at all in the framing and carrying out of any particular scheme for any special case; and secondly, if I do so, whether I should or should not take any payment for the work done. In the meantime, I feel that no human being can pretend to find fault with me if I communicate to you such information on the general question of sewage utilization, and on the special subject of sewage irrigation, as can be communicated in the course of one lecture. It may perhaps seem curious that it should be difficult to impart in an abstract form a sufficient amount of knowledge upon a question like that of sewage utilization, to enable any earnest student to apply that knowledge to a particular case, and to devise and carry out a scheme for any particular locality; but such, nevertheless, is the fact, and I am sorry to say that I know several instances where persons have applied to me to ascertain my general views, and while appearing, at all events, to wish to follow them, have gone away and done something which is radically different. A case in point is that of the company formed to utilize the sewage of Liverpool. Several gentlemen connected with it came to me repeatedly, asking for information, which I always communicated most freely, and yet they have carried out the works in the way of all others I the most strongly condemn, alike on agricultural and on sanitary grounds, and I shall indeed consider myself fortunate if the blame of their failure is not in some measure fastened upon me.

The great majority of sewage farms are laid out on the "catch-water" system, and the objections to this are, in my judgment,

:rable. First, as the bulk of the effluent escapes by flowing *off* the surface into ditches, and not *through* the land into il drains, there is clearly no real security he sewage is purified at all; and in wet er, if the watermen are a little careless, ow the sewage to run too long in any direction, the result must alway be ion of the outfall. Secondly, the essence s system is the pouring of sewage, and same particular volume of sewage, over l successive areas of land. Now it is nely difficult, if not impossible, to con- farming operations in such a way as to e the crops of several adjacent pieces of being always at one and the same time and able to receive and utilize the e; but even if there were not so, it is est that the farmer can never know quantity of manure he is really giving y one of these successive areas of land. ose, for instance, that the sewage is to ver three pieces of land, numbered re- ively 1, 2, and 3, it is manifest that the bulk of the sewage delivered out of the r, which discharges immediately upon , flows over that plot, but as part of quid will be absorbed into the soil and of No. 1, the sewage will be diminished antity when it arrives at No. 2, and still further diminished in quantity it arrives at No. 3; but it will also in case be diminished in strength and zing power, consequently, if No. 3 gets gh, No. 1 will get too much, or if No. 1 nly enough, No. 3 will get too little. is it is answered, I know that there are s means of watering No. 3 or No. 2 ut watering No. 1. If so, why not s follow this system? and what then be- s of the so-called "catch-water" system? the supporters of the "catch-water" n defend it by saying, that as the e always flows over several successive of land before it is finally discharged he outfall, it must always be thoroughly ed. This, of course, is a complete *non ur;* but even supposing that it was not, would become of this assertion when ends proceed to irrigate No. 3, next the outfall, to the exclusion of Nos. 2 and 1? Clearly, as the land is specially laid out to enable the water to flow *off* the surface of No. 3, either into the actual outfall itself, or into an open ditch, delivering directly into the outfall, there is absolutely no means of securing the purification of the sewage under such circumstances. The fact, that it flows *off* the surface, shews that there is more liquid applied than the land can absorb, and the moment that this arises and the discharge begins to take place, that moment must the danger of imperfect purification commence. In fact, if we are to believe that that part of the crop on plot No. 3, in the case above sketched out, which grows next to the side of the discharging ditch or outfall, is as luxuriant as every other part of the crop, it is manifest that sewage, in its normal state of impurity, that is, fertility, must have been brought into direct contact with these individual plants. Hence it is an absolute impossibility that proper sanitary results can be secured on this system, if good agricultural results are obtained. But with the system which I have adopted on my own farm there is no possibility of pollution of the outfall, because you will observe that even as the effect of carelessness the sewage does not run *off* the surface of the land, the worst that can happen is the accumulation of a pond in the furrow; but as a good deal more labour is required for superintending the flow of the sewage on this system, that is, in other words, as the total volume of sewage is more subdivided, and a smaller portion is under the control of each waterman, and as the distance it has to flow over the surface of the ground on any one "land" or "bed," in order to moisten it regularly and uniformly is less, so the possible maximum extent of any accident arising from the carelessness of any individual waterman is minimized to a degree only to be undertsood and appreciated by those who are conversant with the two systems. Moreover, on the catch-water system, the surface under the charge of one man and the volume of sewage under his control are both so great that it is almost impossible for him to see whether or

not the liquid is flowing uniformly to every part of so large a breadth of land; and so, without any carelessness on his part, while he is watching one portion of the land under irrigation, the sewage may be escaping in a black stream from another part. To this it may no doubt be answered, put on more watermen; but there is so little for a man to do in the shape of actual work on this system, that it is in vain ever to expect the farmer to employ another man to assist the first, or to expect either of the men under such circumstances to do their duty, for each man would consider that he was superfluous; and it is a fact that all employers of labour will confirm, that if a man is not given a sufficient amount of work to keep him fairly and reasonably employed, he will cease properly to perform even that small amount which he has to do.

Then as sewage farming must always, in the nature of things, be conducted within a very short distance of a town, it should in most cases be combined with market gardening. Now as market gardening involves the necessity of a great number of successive crops, of comparatively small extent, of a number of different kinds of vegetables, it is essential that an access should be available for carrying off each of the crops day by day as they are ready for market, and that by the same means horses should be taken on to the successive plots for their immediate re-cultivation when cleared of vegetables. In both these cases it is essential on every account that the horses and carts and men should not pass over growing crops. It is therefore necessary that roadways should be left at reasonable intervals. But on the catch-water system it is very difficult to obtain such access to small insolated patches of crops, and it is still more difficult to sewage such small areas without sewaging the adjoining ground, which however may not only not require it, but in certain stages of certain crops may positively be injured by the application of sewage. You will observe the immense convenience of the system of roads which I have established on my own farm. Again, in laying out land as I have laid out Breton's, a large saving in actual labour is effected as compared with the catch-water system. Take for instance plot B. In this case I had not sufficient fall in the length of the beds to carry the sewage from one end to the other, and I had to make an artificial fall. If I had done it on the catch-water system, or any modification of it, I must have given a fall to the entire breadth of the plot; whereas I was able to give a sufficient fall by raising the ridges only, for of course it is a matter of comparatively little importance what is the exact fall from ridge to furrow; the distance being so small, only 15 feet, it is always under control. The saving in the actual lifting of earth in this item must in some cases be very large indeed; and although in the first instance the effect may be to raise the ridges at the high end rather inconveniently high, yet this may be cheaply cured in time, for a few loads of earth can be carted from one end to the other, from time to time, when a horse and labour can be spared; and although as a matter of account it always costs a farmer the same sum to move a ton of earth a given distance, yet as a matter of fact in practice this is not so, because there are many days in the year when the farmer can spare a horse and cart and man for an odd job of this sort, having for some reason no other use for them, and having of course to pay for them all the same. With regard to the cropping of a farm so laid out, I ought not to say very much, for no one should undertake the management of such a farm, whether on his own account or for the account of others, who does not understand something of farming.

ORTS AND EXPORTS OF AGRICULTURAL COMMODITIES.

[E Trade and Navigation Accounts for the month and three months ended of the present year, have been pub-

As compared with the correspond-onth of last year, there is a large in-in the importation of oxen and bulls, imber being 11,607 as against 6541, ie respective values £195,348 and 305, shewing, notwithstanding the out-ainst the high price of beef at the present that it was much dearer last year, so foreign cattle are concerned, as rated Board of Trade valuations, than it is ar. The difference in price per head class of animals is £1, 5s., as in 1870 they were valued at £18, 1s., n the same month of the present year 16s. is the average price.

s also were much more largely im-in the month for which the Returns de up than in March 1870, the number ar being 2288 against 834 last, and the £33,302 as against £13,098, the value ad being, last year, £15, 14s.; this £14, 11s.—a decrease almost as great n oxen. Only 931 calves were received last month, while 1328 were imported the corresponding month of last year. otal money value for March this as £3329, which is at the rate, in numbers, of £3, 16s. per head; last e sum paid for foreign veal in the same was £5744, or about 10s. more per The decrease in the number of sheep nbs received from foreign parts in the of the month was 2550, the numbers -last year, 55,006; this year, 52,456; ns paid respectively were, in March £93,284; in the same month of this 101,236. It thus appears that while we ying less for beef from abroad, we were considerably more for mutton. Last round numbers, sheep were valued at s. per head; this year they "stood us , 17s. We had a slightly larger supply of swine at a smaller outlay of money. The numbers shipped to our shores in March 1870 were 5833, at a cost of £22,644; in the corresponding month of this year we received 5937, at a value of £20,036. Every pig last year, in the month of March, cost us £3, 17s. 6d.; in the like month of this year only £3, 10s. 6d., or 7s. per head less on the average.

Could not a column be added to the Returns, which are now better than they were, shewing the facts which we have here brought out, viz.—the difference in price of the animals each month. It would be very interesting, would save a deal of trouble to readers, and would not entail much labour on the clerks of the department.

In the first three months we have been paying less for live meat than we did in preceding years, but more for dead meat; for instance, in the first quarter we expended £779,635 for bacon, and £225,092 for beef, while in the like period of 1870, we disbursed only £471,855 and £89,866 respectively. The total quantity of bacon imported during the month of March alone, this year, was 127,823 cwts., in the corresponding month of 1870, 90,111 cwts., the cost last month being £340,518, and the month in the year preceding, £265,077. The imports of beef in the month, salted and fresh, amounted to 42,534 cwts., to compare with 21,391 cwts. in the same month of 1870, and the respective costs were £91,333 and £43,638. The amount of butter imported in the month was considerably larger than in March 1870, the values being £665,393 and £573,578. The imports of cheese were nearly doubled, being 80,696 cwts., as against 41,183 cwts., and the price, £233,259, to compare with £141,046.

In wheat, we have had an increase, in the month, of about 300,000 qrs., and an addition to our expenditure, on this commodity, of nearly £470,000, and on the tl

months which have passed, of more than £920,000. The total sum we expended in the first quarter of the year, upon wheat, was £4,395,852, as against £3,474,341 in the corresponding term of last year. On all other commodities, coming under the general head of corn, our expenditure was less in the three months, except in the case of wheat meal and beans, although in the month it was more in most cases.

The following tables shew the exact quantities of our imported grain, and the values for the month of March, in this year and last :—

QUANTITIES.

Wheat.	Month ended March 31, 1870. Cwt.	Month ended March 31, 1871. Cwt.
Russia	932,039	1,732,538
Denmark	7,087	5,990
Germany	65,900	214,053
France	2,050	—
Austrian Territories	18,756	28,602
Turkey, Wallachia, and Moldavia	78,308	74,705
Egypt	3,754	31
United States	1,124,003	537,017
Chili	21,600	—
British North America	21,060	4,350
Other Countries	16,811	31,400
Total	2,291,368	2,628,686

VALUE.

Russia	£403,884	£986,462
Denmark	3,189	4,080
Germany	33,256	142,299
France	982	—
Austrian Territories	8,518	18,252
Turkey, Wallachia, and Moldavia	32,741	44,363
Egypt	1,595	25
United States	553,845	314,785
Chili	11,340	—
British North America	9,740	2,501
Other Countries	7,661	17,031
Total	£1,066,751	£1,529,798

QUANTITIES.

	Month ended March 31, 1870. Cwt.	Month ended March 31, 1871. Cwt.
Barley	566,634	619,244
Oats	298,931	459,283
Peas	38,092	51,177
Beans	162,160	202,166
Indian corn	1,363,497	836,287

VALUE.

Barley	£204,522	£189,282
Oats	102,282	191,534
Peas	14,906	22,644
Beans	64,057	92,285
Indian corn	431,809	340,316

QUANTITIES.

Wheat Meal and Flour.	Month ended March 31, 1870. Cwt.	Month ended March 31, 1871. Cwt.
Germany	115,419	97,380
France	89,070	2
United States	203,407	185,757
British North America	202	884
Other Countries	20,036	137,629
Total	428,134	421,652

VALUE.

Germany	£72,137	£93,065
France	60,122	2
United States	125,180	156,942
British North America	125	731
Other Countries	12,487	142,977
Total	£270,051	£393,717

There is still a noticeable decrease in the supply of eggs, the quantity received during the month being 319,968 great hundreds, as against 383,320; the value, however, was greater, being £116,897, to compare with £114,996. Of hams we had a much larger supply, the respective quantities for the latest comparative month of 1870 and 1871 being 4061 cwt., and 10,170 cwt. Potatoes, and poultry and game reached us in smaller quantities; but we received nearly three times as much pork as we did in March last year.

The active demand for bones which we noted last month, continues. In March last year, we imported 5769 tons, in the same month of this year, 7235 tons, at costs respectively of £37,503, and £45,116, the price being lower this year—viz., £6, 4s. as against £6, 10s. per ton. There was a large falling off in guano the quantity received being 13,867 tons, as against 23,343 tons in the corresponding month of last year. In nitrate of soda also, there was a diminution in the month, but on the three months the increase amounted to upwards of 200 per cent. Oil-seed cake we imported more largely than in March of 1870, and so also, cotton, linseed, and rape. Clover and

we received much more abund-
77 cwt., to compare with 49,859
ch of last year.

QUANTITIES.

	Month ended March 31, 1870.	Month ended March 31, 1871.
, and Lambs.	lb.	lb.
es in Europe...	580,600	1,120,710
Possessions		
outh Africa.....	3,431,548	2,892,530
India.....	424,455	2,457,717
lia.....	33,928,049	22,729,913
Countries.....	994,967	1,178,926
otal.....	39,359,619	30,379,796

a considerable decrease in the
f wool in the month, entirely
ıe defection of Australia, so far as
is concerned; but on the three
e have an increase of about
lb. The following table shews
ı's supplies, and whence we de-
:—

VALUE.

From Countries in Europe...	£35,580	£68,400
,, British Possessions in South Africa.....	221,621	130,786
,, British India	13,265	85,633
,, Australia	2,060,922	1,367,026
,, Other Countries.....	33,431	49,116
Total.....	£2,364,827	£1,700,961

The tables of exports of British and Irish produce let us into the secret that we are consuming less of our own butter and more of our own cheese at home than we did in the month of March last year; that the demand for horses for France still continued up to the end of March, 1038 having been exported to that country as against 20 in the same time last year, and that their value had sunk from £50 to £31 a-piece. We exported 1,010,496 lb. of wool, to compare with 732,188 lb. in March, 1870, and realized for it the sum of £74,251, as against £46,668.

Our Library Table.

Trees and Shrubs for English Plantations. By Augustus Mongredien. With Illustrations. London: John Murray, Albemarle Street, 1870.

IN this volume of 388 pages 8vo, 621 species of trees and shrubs belonging to 269 generæ are described, which the author has carefully selected from the large multitude which, from time to time, have been introduced from all parts of the world, and of which he asserts that "the vast majority are not worth cultivation for ornamental purposes." The preface is dated from Heatherside, Bagshot, Surrey, and here, it is presumed, "he possesses in his own grounds, specimens of nearly all the species he has described." The first part of the work, extending to page 223, is devoted to the description of the forementioned number of plants, and in the second part they "have been distributed into a variety of groups, according to the many different points of view in which they present themselves in reference to the special purposes of the planter."

In the descriptive portion, the arrangement is alphabetical, a mode which, although supposed to be the easiest for reference, is distasteful to botanists from its discordant jumbling together of widely diverse kinds; while to the less initiated it is fully as repulsive and confusing, especially when, as in the present case, there is not an accompanying index list of the most common or popular synonyms. To mere varieties, almost no place is assigned in the work—an unpardonable omission in a publication which is professedly intended to enable planters to avail themselves of all the resources at their command in forming or improving shrubberies, plantations, and parks—and in glancing over the selected kinds, most skilled practitioners will find a good many species omitted which they have been accustomed to regard as indispensable for the production of desirable characteristic effect. In justification of the first of these objections, take the Silver Fir tribe, which is pretty generally known under the generic name of Picea. Many who deem themselves pretty well conversan with the Coniferæ may not be aware that some influential botanists have come to the conclusion that the upright cones, with their deciduous, or falling-off-when-ripe, scales, and the thick regularly coated seeds, together with some minor differences, are not sufficient to distinguish the silver firs generically from the spruces, with their pendent persistent scaled cones and thin-skinned seeds. Such would be at a loss to find out the Piceas, were they not by chance to discover them, under the name of Abies, scattered thoughout, so as to form only one genus. And the like difficulties also exist with several of the Ericaceæ, and others. Practised planters will find many species omitted which they have been accustomed to regard as superior to other, that are included, such as that most elegant of hard trees, the Picea, or, as it should have been called, Abies bracteata, the A. (P.) robusta, A. Hookeriana, &c. That most graceful and hardy bamboo, the Arundinaria falcata; Pinus monticola, P. pumilios and others of the true Pines; the most noble of deciduous oaks, Quercus pannonica, the very ornamental yellow, whitish, red and purplish twigged willows, unless Salix purpurea, an evident misnomer, be intended for one of them. Most of the proved hardy Sikkam and Bhotan Rhododendrons are also omitted. But the absence of striking varieties is still more marked than that of species, for who would turn for information on ornamental trees and shrubs to a descriptive list of them, from which is excluded the Corstorphine and Jersey Plane trees, the copper leaved Beech, variegated Hollies, almost all the varieties of Ilex and other evergreen oaks; the weeping, variegated, and other peculiar foliaged varieties of the common and Turkey oaks, most of the variegated Coniferæ; the splendid race of hybrid Rhododendrons, the still more numerous family of Roses, &c.? Nor is the repeated assertion that "in this work only such species as are botanically distinct, are admissible," any valid excuse, seeing that a considerable number of varieties are actually described, and the book has little claim to rank among really botanical publications.

In Part II., which contains thirteen chapters and hirty-nine lists or sub-divisions, the whole are analyzed or classified under various aspects, such as size, habit, foliage, inflorescence, timber, utility in the arts, and otherwise, geographical distribution, &c., shewing a considerable amount of labour injudiciously and by no means correctly applied. Thus in Chap. I. List 2, consisting of trees which attain to more that 60 feet in height, Abies nigra, A. orientalis, A. (Picea) Pinsapo, &c., are included, while no place is given to either the Norway maple or the common plane-trees—Acer platanoides and A. Psuedo-platanus—nor to the Quercus Ilex and the Robinia Pseudo-acacia, both of which, in many an English park, far exceed the prescribed dimensions; while in this, as well as in List 3, which last is devoted to trees of 30 to 60 ft. in height, many are included which are so tender that they will never attain to their

gned sizes in few, or any even, of the most ured climates of Britain—such as the following in List 2 :—Ailantus glandulosa, Dacrydium nklinii, Gleditschia triacanthos, Nyssa villosa, nera acuminata, &c. ; and in List 3, Acacia albata, A. lophantha, Catalpa syringæfolia, Fagus nninghamii, Maclura aurantiaca, Magnolia grandira, Laurus Sassafras, Lyonia arborea, Liquidamber yraciflua, Ostrya virginica, Pseudo-larix Kæmpferi, c. A number of the above appear in List 36, among 'species requiring protection in this country," to which all of them may, and many others which are named in Lists 4 to 7, should have been confined ; for associated as they are in these Lists with really hardy kinds, their names have a tendency to mislead rather than to guide planters who may look into them for assistance in asking their selections.

We cannot avoid our expression of regret in being unable to give a more commendatory notice of Mongredien's "Trees and Shrubs for English Plantations;" for the volume is most handsomely got up, the paper, printing, chromos, and wood engravings, being *de luxe;* while in its preparation much labour and research must have been expended.

The Garden.

GRAFTING FRUIT TREES.

THE art of grafting may be succinctly described as the rooting of the growing parts of one plant into the wood of another, and the uniting of the two together into one for the future. It is a kind of matrimonial union that admits of no appeal to any divorce court, but that of forcible separation. And yet the union can hardly be called an amalgamation. Neither is it retrospective. The personal identity of stock and scion are preserved intact to the end. There is no fusion of the old parts of either into one, but an amalgamation of the new. The union effected is not one of anatomical but functional identity. A graft is like an adventitious leaf bud. Inserted out of the natural order in an abnormal position, it nevertheless proceeds to discharge all the functions of a natural bud or branch. Grafting affords a ready means of utilizing root force to better purpose. There is a stock of growing power in a strong tree. Its produce is worthless, but the producing force is close at hand, and convertible to better uses. Every worthless fruit tree has cut in legible letters on its bark—force to let. The grafter comes, whips off its head, inserts his scions, and thus virtually turns the sluices of growing force into new channels of higher utility. There is a vast saving of time and economy of force resulting from the practice of grafting. Instead of destroying, it simply diverts productive power into higher and more profitable channels. It is a capital illustration of the modern theory of the conservation of energy. Without greatly limiting its absolute amount, the graft completely changes its direction. It taps the deep root springs to better purpose, and fills the common fruit basket with superior produce. The operation is so simple, the results so certain, that no one should grow an inferior variety of fruit. The very best take no more room, require no greater skill or expense in the cultivation, than the worst. Grafting and budding offer a means ready of exchanging the latter for the former, with the shortest possible interregnum of a constant supply between. No gardener should graft all his trees; he need not even graft the whole of any one tree at once. Let those who have but one proceed to graft it, one branch at a time; and those who have many, graft one or more trees at a batch. Thus the supply of fruit need not be seriously interrupted. Even when the fruits are good, one tree of each is often an excess of one sort in our gardens. Grafting enables the holders of small gardens to have each branch of their trees a different sort, if they are so minded. Many varieties from one root is one of the greatest advantages of grafting. For though each scion feeds at the same root table, each variety maintains its own individuality. And it is possible to gather all sorts—early, late, medium—for a year's supply off one tree. Grafting is not only a real common gain, but an endless source of interest to the villa gardener. One of the greatest drawbacks and difficulties of the fruit supply in small gardens is its precarious character. It is too apt to be distinguished by a series of gluts and dearths: now, too much of one fruit, and again, none. By a careful selection of scions, all this would be avoided. The supply could be spread regularly over the season. An anniversary of wedding, birth, or other festive day, might be provided for by selecting fruits in season for these red-letter times. The mere act of grafting is likewise full of

and has been a favourite theme
ime, as well as source of illustra-
ı the great men of past ages.
rigin of the practice is shrouded in
It probably originated in an accident.
anding closely together, often crush
ıgainst branch. The wind moving
ıs about would abrade the bark. The
branches might remain long enough
ɔgether, to adhere, and hence i\-
ı of grafting by approach or inarching.
.s, to the bringing detached branches
with other plants, is not a very wide
robably it struck the antients that if
ɔranchlets, cuttings, could be brought
ı the ground, that scions might send
scular filaments in search of food
tissues of other trees. Be that as
the practice has spread through all
nations, and is a great boon to
wers, especially to our gardeners.
ditions of success are few and simple.
ike; immobility, and exclusion of air.
ɔark, cambium to cambium. Perfect
tenure in the same position until the
effected, and an air-proof covering of
material. A certain amount of
seems likewise necessary to enable
s to unite readily. Wounds like-
l with greater despatch when bound
mly together. A rather close rela-
must also subsist between the scion
tock. They will not unite beyond the
certain close lines of affinity. Apples
grafted on crabs, paradise stocks,
; of all kinds, and even on white thorn;
quinces, though some varieties do not
well on medlars; mountain ash and
he peach on the almond, &c. As a
rule, for all practical purposes, it
affirmed that only varieties of the
:cies, species of the same genus, and
the same natural order, will unite
thrive or fruit well afterwards. Graft-
ɔt only practised to utilize root force
in full activity and to afford variety
mited areas, but likewise to promote
ınd hasten a fruit-bearing condition.
e years, grafting has been a recognized
of promoting both these objects. If
grafting once will not suffice, double or treble grafting has been resorted to. Graft the stock with one variety, and on this graft another, and so on. One may modify the ratio of growth, the other control fertility; and it is held by some that a third scion, added upon the second, may influence quality. All this is more or less uncertain. This much, however, is known, that the quince stock induces early fertility in many pears, and that the paradise stock develops early, and favours constant fertility in most apples. Both of these, again, are what are called dwarfing stocks. They moderate growing force, and develop fruitfulness. A fruit-bearing habit again once established, is the best and most powerful aid to unfailing fertility. Establish this by the mere selection of stocks: these dwarfing stocks and precociously fruitful trees are indispensable to the small gardener. They take up little more space than a gooseberry bush, and yet fill the family basket with the finest apples and pears.

With these few remarks on the origin, the nature, and a few of the uses of grafting, I will now proceed briefly to define the process. As to time, from the middle of February to the end of March is the best season to graft. The sap of the stock should be in full motion, so that the bark will readily separate from the wood. The scion should have been removed from the tree a month, at least, previously, so as to be a few weeks behind the stock. In this backward state, the buds of the scion do not suffer from the slight interregnum or interruption of the flow of the sap. The base of the scion is flooded with the rising sap, and by the time the buds of the scion move on and exhaust their own fluids, and set up a demand for more, abundance is ready to be forwarded. Whereas, if the scion is in a growing state when it is inserted, its buds will have exhausted its own fluids before the new channels are opened. Exhaustion and contraction ensue, the channels are stopped up, and death ensues. Scions should also be chosen of medium growth, not rank-growing wood, from the middle part of the shoot; neither its sappy top nor in-

durated base make the best scions. They should be kept in moist earth until wanted. No other preparation is equal to this. Drying in the air, or soaking in water, are alike to be avoided. The part of the scion to be inserted in the stock must likewise be scrupulously clean. No earth or sand of any kind must come in contact with the uniting parts.

There are numerous modes of grafting, such as crown, whip, saddle, cleft, &c. Here is an illustration of each variety. Crown grafting (fig. 1) is perhaps the simplest of all. Take off the branches or cut across the tree, *d*, with a saw. Cut this top smooth,

Fig. 1.
Crown Graft—1.

Fig. 2.
Crown Graft—2.

Fig. 3.
Whip Graft.

and round it off with a sharp knife. Then take the scion and cut the lower end into a thin wedge. Make a slit in the bark of the stock of the same length as the wedge of the scion. Open the top and edges of the bark, and push down the scion to the required depth, say 1 or 2 inches. If the stock is large, three or even six scions may be put in all round it in the same way. It is important, however, that too many scions should not be inserted so as to loosen the bark all round. If this is done, it endangers the union of the scions. There ought to be a piece of bark, unraised, between each of the introduced scions. With this provided

Fig. 4.—Tongue Graft.

Fig. 5.—Saddle Graft.

for, it matters not how many are put upon one stock. This is the simplest mode of crown grafting.

Another mode is to allow part of the scion to overlap the stock, as in fig. 2. This gives a certain amount of security and solidity to the scion. It rests on the top of the stock, and the overlapping portion, with its growing bark and overspreading alburnum, helps to heal the head of the stock. In this mode of grafting it is needful to tie some strong supports to the stock, and to carry them well up beyond the scion to make the latter secure to them. Of course, as soon as the scions are inserted, they should be tied firmly in position with matting, or india-rubber or gutta-percha bands, and clayed or rendered air-proof with grafting wax, or some air-proof composition.

Whip or tongue grafting (fig. 3) is that most generally used for small trees or branches, when the scion and stock are nearly of one diameter. The stock and scion are cut off in a slanting direction, the one upwards and the other downwards, at as nearly as possible

gles, so as to form one round branch them. Then a sort of tongue is cut ı, they are fitted into each other bark and wood to wood, as neatly as posuch grafts generally succeed well.

is a different mode, and a more illustration of a similar method of

The tongue is placed in the side of k instead of in the middle of the , scion; *b*, stock).

grafting (fig. 5) takes its name scion being placed astride the stock,

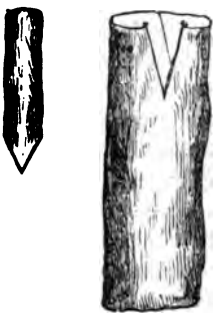


Fig. 6.—Cleft Graft.

ıorseman on a saddle. It requires nipulation and exact fitting to comıccess, but with this, and careful nent, it is a good, strong mode of

Great care must be taken not to end the scion. If the bark of one sides of the scion can be inserted into the stock at *a*, it would help it ably.

grafting (fig. 6), as its name implies, m in which part of the stock is cut out, scion is cut into the form of a wedge, to fill up the vacuum. It is a troublesome mode, but much in favour with some practitioners. It has the merit of holding the scion firmly in its place. The success of this, and indeed all other methods, depends less on the manipulation of the wood, than upon the complete contact of the inner barks of the stock and scion and the exclusion of the air.

I must name one more, and that a most convenient mode of grafting, which is generally adopted for wall or espalier trees, and called side-grafting. A notch is cut into a

Fig. 7.—Side Graft.

branch of the main stem, and a sloping piece of wood cut out (fig. 7). A small scion is then put in in the ordinary method of crown grafting, or a small piece is cut out of the branch, and closely fitted to the bark at top and bottom. These are the most certain and handy methods of grafting trees.

The great points of success in all modes of grafting are, clean cutting of the growing surfaces, neat and expert work, firm ties, air-tight dressings, and perfect immobility till the union is effected.

REV. J. FOUNTAINE'S VINERY AND RAILWAY ORCHARD HOUSE.

A SMALL pamphlet, intitled, "A New and Improved Method of Growing Fruit," has of late been circulating amongst gardeners. Many, on seeing the title, no doubt would adopt the sceptic's sneer, and cry, "Look! nothing new to be discovered in this, I know." Others would wonder what it could possibly advance on such a threadbare subject, and some few would secure the pamphlet for themselves, in the vain hopes of being able to grow their fruit thereby in some magical sort of way, and so over-reach their neighbours. Many may not have even heard of it. And some of our readers, perchance, might wish for a little information on the subject.

The pamphlet in question, then, is written by the Rev. John Fountaine, of Southacre, Brandon, Norfolk, a clergyman and a most enthusiastic horticulturist. It tells us how the writer has grown fruits to great perfection, and also how to grow fruits, Grapes, and stone fruit, Peaches, Plums, &c., in one and the same house, by the adoption of the method and principles therein explained. I shall try shortly to give some idea of this so-called improved method of growing fruit upon the Orchard House principle.

Gentlemen who are possessors of small gardens, possessors of only one house, for the cultivation of fruit, yet particularly fond of and desirous of having a little of all kinds —a few Grapes as well as a few Peaches, and Plums, and Cherries, &c.—have all along found it extremely difficult to gratify their wishes. The cultivation of Grapes and stone fruit, with anything like success, has ever been considered almost an impossibility. The treatment suitable for the one was injurious to the other. When one succeeded, the other about as surely failed; yet in his Mr Fountaine has been eminently successful; and it is for you, readers, if you follow his precepts, to be so likewise. The orchard house, properly managed, is one of the best and most useful structures in a garden, and next to that, a vinery. The orchard house provides for a supply of Peaches, Plums, Cherries, Pears, &c., and we have not a single word to say against it: the trees may be grown in pots or planted out. Some failures occur with orchard houses, especially with regard to the flavouring of the fruits. Quality is never secured, if quantity be striven for. For stone fruits, also, to attain their full development of flavour, they require an immense amount of fresh air. Yea, they require almost to live in the open air when the weather is at all favourable; but as this is somewhat difficult in many orchard houses at times, the consequence is, as they seldom have enough of it, that the fruits are flavourless. An orchard house, *pur et simple*, is not quite warm enough for the proper production of Grapes. Some in warm seasons, such as the Royal Muscadine, may do fairly, but there is no success. The Grapes are often sour.

In the ordinary vinery, again, Grapes can alone be successfully grown. It is heated, and your Peaches, &c., do not require it. It is close, and that to them is injurious; besides, the Vines overhead shade completely, and shut out all the sun's rays from your trees below; or the one, in some way or other, interferes with the other, and there is failure.

In the Rev. John Fountaine's vinery, fig. 1, the case is at once altered and the difficulty bridged over. Here, as we are told, and here, as I have seen accomplished, the cultivation of the two is most effectually combined. This is to all intents a vinery. The Vines, as shewn, being planted against the back wall and in front, and trained on roof in the usual way, excepting, however,

that Mr Fountaine has the front Vines, or those trained on roof, some 7 or 8 feet apart. The reason for this is to allow plenty of light to enter between these, for the benefit of those on the back wall, but more especially for the fruit trees placed underneath them. At F is shewn a space which is occupied by stone fruit trees in pots placed on trucks. The principle consists of a line of rails laid in and out of the house through large folding doors at the end. The trucks alluded to are of an orchard house, as a vinery, with orchard house trees in it. By the adoption of such a house as this, the orchard house is in a measure dispensed with, as the advantages of the two houses are thus combined in one.

The mechanism of these trucks is of a very excellent character. Those now being made are of cast iron lattice work, of an ornamental character—*i.e.*, the flat stage. Each truck is about 10 feet long and 6 feet wide: on this eight cast-iron pans are placed, or

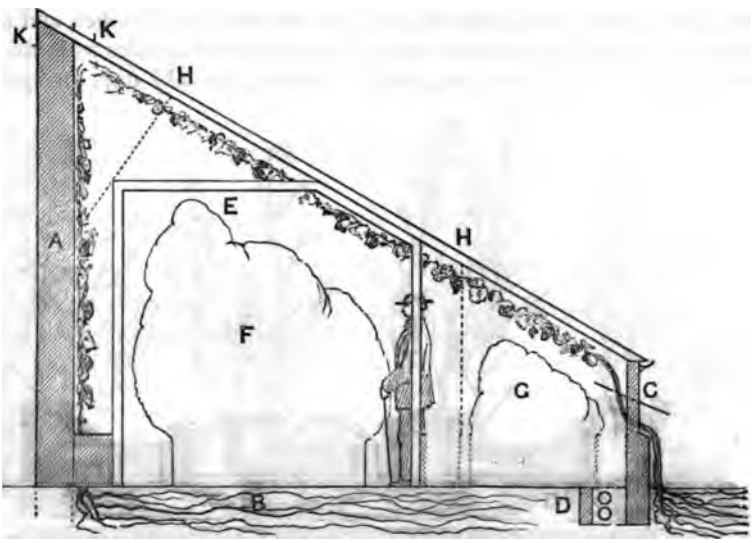


Fig. 1. —Section of a House in which Grapes and Stone Fruit on Trees in Pots may be grown together in the greatest Perfection.

A, Back wall, height inside, 14 feet; B, width inside whole house, 17½ feet; C, ventilating lights and 18-inch wall, from ground to eaves, 4 feet; D, hot-water pipes, sunk, may be above ground if no door at other end of house where pipes enter; E, folding-doors, opening square, *ex* corner, 9 feet; F, space traversed by trees on trucks; G, smaller folding-doors through which flower trucks are run; HH, pillars of hollow iron, 2 inches diameter, at intervals, to support two T irons running beneath and supporting rafters through the whole length of the house. *N.B.*—The pillars fixed in the ground cannot be nearer the centre of the house because of the paths; KK, plenty of ventilation all along, either in back wall or top of glass, the latter best—Beard's patent good, but expensive.

placed on these rails, and on the trucks, or movable stage, as it might be called, are placed the trees in pots, some plunged in pans filled with earth. The whole stage, on wheels or truck, can thus be moved in and out of the house with the greatest freedom, with the trees upon it, see fig. 2. Having thus, as Mr Fountaine observes, the change of climate under command, it requires only common judgment to take advantage of it. By some, this structure is called the Railway Orchard House. It is, however, not so much rather hung, with about eight gallons of earth in each, in which the pots with the trees are plunged, and each pan is made to revolve easily on its own axis, so that any part of the tree may be turned round at pleasure, either for the purpose of exposing any part to the sun, or for the more convenient manipulation of the trees. The whole thing is indeed very ingeniously contrived and executed.

What, however, are the direct advantages obtainable from a structure of this sort?

We get, in the first place, a vinery. The house must, indeed, in all respects, be treated as a late vinery, the whole of the innovation being only that connected with the orchard house fruit trees, the railroad and the trucks, whereon these trees are placed. Supposing the vinery—a lean-to—to be 60 feet long and about 10 feet wide, this could be fitted up with two lines of trucks, six at back, each 10 feet long, and six in front. A space of about 40 feet at each end if the house is further required, on which to place the trucks when shunted out through the folding doors at either end, made large enough for the purpose of the vinery. The space required, therefore, for this compound house is just about equal to that required for the two houses separate. The cost for fitting a house of this length, with the trucks and rails inside and outside complete, would be something about £50, rather less than it would cost to erect another house of the same length, and with corresponding advantages.

It being admitted that air, and unlimited in its supply, is required for bringing to perfection our orchard-house fruits, one great advantage of having the trees thus easily movable is at once apparent. On fine days in spring, whilst the trees are in flower, nothing could be better than to run them out to the open air, shunting them back again at night, &c. There would be no failures then in the setting of the fruits. So, again, the blossoming could be much retarded by keeping the trees as much as possible in the open air, and the ripening of the fruit as well—lengthening the season's supply several weeks. It is, indeed, more useful for retarding and keeping back, than for bringing forward; and the one is equally as important as the other. It is a very important matter to be able to extend the season of our Peaches, and this Mr Fountaine's method enables us to do.

During the cold days in spring, after the fruit is set, the trees must of course remain inside, but placed outside on all favourable occasions. In the warm summer evenings they are benefited by being left in the open air altogether, where they get refreshed with the nightly dews, using the house as a place of refuge only from cold, stormy weather, or scorching, sultry winds. Fruit of Peaches, Plums, Cherries, Pears, &c., produced in this way, are infinitely superior in flavour to the ordinary run of those from a orchard house.

One of the finest examples of a house of this sort is to be seen at Blenheim Palace, the seat of the Duke of Marlborough. It is wonderfully well managed, and has proved

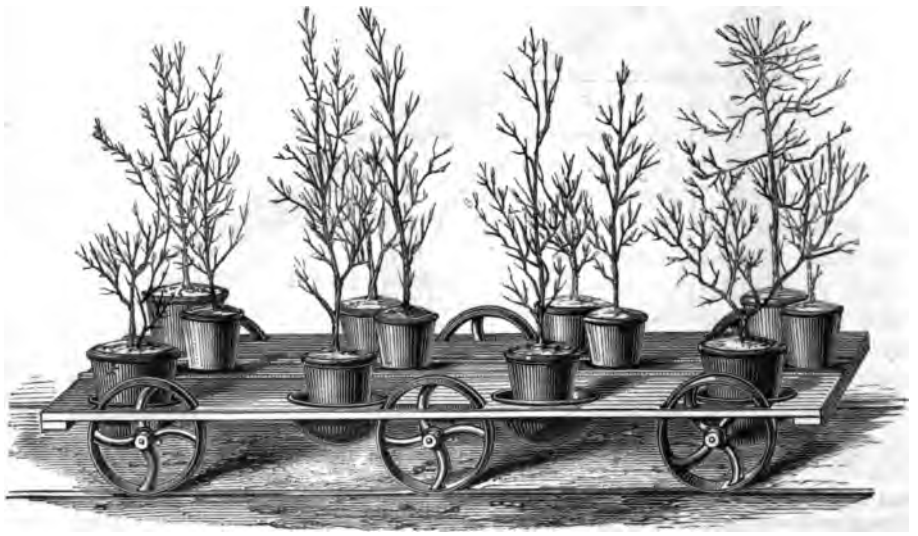


Fig. 2.—Railway Plant Stage.

ıccessful. It is spoken of in the highest by Mr Lee, the Duke's skilful gardener. eing and tasting of Mr Fountaine's own ıs in Peaches, the Duke fancied it, and l the house erected. Some others are ve believe, on the same principle, to be d for the Prince of Wales at Sandring-

Another, a smaller one, has been d by Mr Fountaine himself, to shew principle" to the public in the gardens Royal Horticultural Society, Chiswick, which all who feel interested may go and see.—*B.*

N.B.—We understand the wooden trucks represented by the engraving have been entirely superseded by iron trucks, manufactured by Messrs Barnards & Bishop of Norwich, superior in every respect. Amongst other advantages, the fruit trucks are convertible into flower trucks, in a few minutes, or *vice versa*. Improvements also have been made upon the Chiswick vinery.

Work in the Garden during May.

From "THE VILLA GARDENER."

THE VINERY.

:E Vines will now be making rapid progress— shewing flower probably. This is the time the maximum temperature must be reached— :g. by night and from 80 to 85 deg. with :at by day. The villa gardener must note the :nce between these two. Seventy deg. is the ıighest artificial temperature that vines should ɔjected to, either by night or day; some would deg. for Muscat grapes, and others take off 5 for Hamburg, and other hardy varieties; but g. is a safe heat for all. Amateurs might natuinfer that heat was heat, no matter from what e it came. But it matters greatly. Plants will not only with impunity, but with positive adge to their health and strength, an amount of ıeat that would prove most disastrous to them ived from any other source. Neither are the ns very far to seek. Some would say the one natural, the other artificial, but that merely ;es the form without solving the difficulty. The :r solution is that the sun heat brings light with d the artificial does not.

ring the flowering period of the Vine, the exact ı is instantly revealed by their exceeding sweetthe branches should be gently agitated several in the course of the day, to disperse the pollen. surer method of getting a full regular crop is to the hand gently over the bunches. The whole will soon be sprinkled with the finest golden ı dust, and some portions of it will adhere to the ı, or embryo fruit, as the hand passes over

The hardier kinds of Grapes, however, set well generally with a gentle shake, or even without if the weather is bright and sunny, and the temperature is kept to 70 deg., and tolerably dry. All path sprinkling, syringing, &c., should be arrested, or very sparingly applied, during the blooming season. As soon as the Vines are set, which is shewn by the tiny flowers falling off like thickly sown seeds, the temperature may be lowered 5 deg., and a more moist atmosphere maintained. But all sudden depressions and draughts must be most carefully guarded against, as nothing can well be more easily injured than the young naked fruit of the Grape Vine. A current of cold air, the touch of a rough hand or sleeve, or a chill at root or top, rusts the tiny Grape in its cradle, as it were, and holds it firmly in a hard, iron-like vice, that it scarcely ever can outgrow afterwards. A sudden squirt of the syringe, especially if the water is cold, may also produce this great evil and disfigurement—rust. For this reason many never directly apply water to their Vines from the time they shew fruit till the ripe Grapes are cut. By pouring plenty of water on all surfaces within the house, the leaves are enabled to get all the liquid they need pure. The sediment of every kind is left behind. Continue to stop all lateral shoots at every leaf formed, and the leading shoots when they reach the top of the house. Or, better still, possibly, let the latter grow down the back wall unstopped. By this change of position growth will be partially checked, and by allowing the shoot still to rush on, sufficient food will be brought within easy reach of all the swelling fruit, and new roots be pushed forward into new ground to bring in supplies of food.

Fire heat may probably be dispensed with towards the end of the month. Give a little air at six o'clock in the morning; shut up and damp down the house at four or half-past four, and have no fear, though the sun runs up the temperature to 90 or 95 deg. This is your reserve force of caloric for the long night's supply, and is so much deducted from your coal bill.

THE ORCHARD HOUSE.

Water the trees thoroughly, as often as they become dry, which will be every day during bright warm weather, if grown in pots. If planted out, a good soaking once a-fortnight or week will suffice. Fruit trees, during the preliminary stages, do not draw very heavily upon the roots. When the leaves reach full size, and the fruit is swelling fast, then the run upon the root larder sets in full and strong. Success in orchard house fruit culture, however, may be said to rest upon the watering-pot. Water with skill, and a crop is almost certain. Deluge the trees with a surfeit, or let them flag with thirst, and they drop the fruit, it is gone off in a tiff. The same great mishap occasionally happens by giving the trees, at an early stage, strong liquors, or manure water. Most writers recommend liquid manure for orchard house trees, and forthwith it is given to them in all stages and conditions. It is imbibed, forwarded to the tender fruit; they are overcome by its potency, and down they fall, to rise, alas! no more. More uniform success would be reached in such matters if we recognized the immense difference between baby and partially matured fruit. Milk for babes, and strong meat for men, is as true of the members of the vegetable kingdom as of the human family. Until stone fruit approach the stoning period, it is safe practice to withold manure water. Neither must they have it very strong at any time, certainly not while that ticklish ordeal stoning is being passed through. Next in importance to root, is leaf or overhead watering. If there is no danger from frost, the trees should be washed with the engine or syringe twice a-day—7 A.M. and 5 P.M. are suitable times. In applying the water, see that the under side of the leaves are sprinkled as well as the upper.

Ventilation must be thorough and constant. On mild nights a little air should be left at the top of the house. And if this is not practicable, a little should be given by 6.30 on bright mornings. In cold windy weather, it is a good plan to veil the open spaces for the admission of air with woollen matting of a ¼-inch mesh. This entangles the air in its passage inwards, and heats it on its way to the trees. It likewise lets out the heated air, and in the cold, in a gradual way, without creating draughts, or causing sudden transitions of temperature. All these trifling incidents are of great importance to tender leaves and young fruit. After providing these means of growth, we must see that no enemies are preying upon our favourites. Caterpillars will be found making dwelling-houses of some leaves; aphides of all sizes, sorts, and colours, sucking the juices of all. The former must be crushed to death within his leaf dwelling, the latter choked in a dense cloud of tobacco smoke.

Disbudding, or rather pinching and fruit thinning, must likewise be proceeded with. Where too many branches have been left, some of them must now be removed. And where the trees are to be treated on the pinching system, the shoots will need their first pinch this month. Nothing can be simpler than this method of checking growth. Count the leaves from the base of the shoots—one, two, three, four, five, six, take its head off at the sixth leaf. The leading shoot—that is, the terminal branch on each main division of bush or tree, or the solitary leader of conical or cordon trees—may have a few more leaves allowed them according to the space, &c., at command. But when eight or ten leaves are made, pinch these also. This is the usual mode of preserving orchard house trees in pots within bounds, and of forcing the wood buds—into fruit buds—at the point of the knife, or rather the end of our finger and thumb.

THE GLASS HOUSE.

Prune and train climbers on the roof, and prepare for the display of summer and the providing of autumnal beauty. Camellias may be potted as the the flowers fade, and placed in the most shady part of the house. Azaleas in flower should be shaded to prolong their season of beauty, and to preserve the purity of their delicate colours. A few hours' sunshine beating upon such things will cut short their flowering season by a week or a fortnight. The glass house should be kept cool at an even temperature of 45 or 50 deg. during the month. Sudden fluctuations of temperature are worse than flower gatherers or bouquet makers. The latter gather many flowers, but the former mow them down in whole battalions. Other destroyers of flowers are also very busy during the month. Our old friend the humble bee is one of the very worst. He pushes his great clumsy body and sharp nose into every choice flower within reach, and bruises and breaks them down in the most reckless manner. He delights most of all in Azaleas, or Show or Fancy Pelargoniums, and he ought to be kept or driven out of the glass house when these are in bloom. The latter will now require considerable attention in the way of staking, training, tying, and watering. As soon as the head of bloom is fairly formed, they may be watered with manure water, and have as much light and air as the weather will permit, until the flowers expand, when a slight shading will prolong the blooming season. Fuchsias should now be shifted into their blooming pots and carefully trained and stopped. Basket plants should be overhauled, renewed, and have larger baskets or new soil if needful. This is also a good season to shift any

ouse plants that require more root room, such ths, Epacrises, Ferns, Lycopods, &c. Water reely as the season advances, especially such as Cinerarias, herbaceous Calceolarias, either er or advancing towards it. Give air regu- he amount depending upon the weather. None be given when the outside thermometer is 40 deg. When it reaches 45 deg. a fair por- hould be given, above 50 deg. any quantity the wind blows strongly. If so, better have an of heat in the glass house, than the rough and winds tearing through it, to the abstraction of h juices from the leaves, and the tarnishing of blossoms. Fumigate with tobacco smoke the nt fly appears, and keep plants, stages, shelves, nd floors, scrupulously clean.

PITS AND FRAMES.

Pits.—Keep a temperature of 65 deg. in those d to Cucumbers or Melons, or the raising and ig of such plants as Balsams, Cockscombs, or ender plants. Even what are called sub-tropical , such as Cannas, Papyrus, Wigandias, ms, Brugmansias, Caladiums, &c., for the garden in summer, will be all the better if to a good size in a brisk heat till the end of nth. The stronger most of these are when re planted, the better they grow afterwards. here is no hurry in getting them out—they will ter if not planted till the middle of June. The remarks are applicable to Celery, Tomatoes, s, or Capsicums. Sow and nurse up in a brisk nd then gradually move to the open air, before re finally planted out of doors. Covering at and stopping such plants as Cucumbers and s, shifting or pricking of seedlings, watering eeping clean, will form the chief work in warm frames in May. A little air should be left on ht to prevent complete stagnation in the atmo-, and to allow the escape of any rank steam ay be generated within these structures, or get m the dung casings or linings that surround The latter should be turned, and partially ed every week, where a brisk top and bottom re needed. And until the end of the month, ng casings or linings should reach up to the op of the wall or frame. Much evil is wrought owing in an intense heat to the roots of Cucum- nd Melons, and allowing the top atmosphere to pressed, through unprotected bricks of hot pits, rds of hot frames.

Pits.—Water Potatoes, Radishes, Carrots, &c., epid water, and give enough to go right to the ity of the roots. Harden off all bedding gradually and carefully, avoiding sudden es and harsh treatment ; remove the lights of , Picotees, Carnations, Auriculas, &c., in fine er, and give plenty of air at other times, and Auriculas for a few hours near noon from the direct rays of the sun, while the flowers are opening, and for a longer period after they have opened. Sow Polyanthuses, Auriculas, Pansies, and prick off those sown earlier. Pot off singly Chinese Primroses, Cinerarias, &c., and put in cuttings of Phloxes, Hollyhocks, Penstemons, or other herbaceous plants. Give Dahlia plants in small pots another shift, and push them on under glass till the first or second week in June. Tender annuals, such as Perilla, Amaranthus, Lobelia, and others, would be much more effective if space could be found to treat them in the same manner. Calceolarias for the flower garden, remove the glass from. Herbaceous Calceolarias for pot culture, prick or pot off, keep cool and shaded.

THE FLOWER GARDEN.

All villa gardens should be furnished on the mixed style, or, better still, a portion of them devoted to several modes of furnishing. Summer bedding-out, pure and simple, means a bare fallow for a flower garden from November to June. This is an eyesore amid broad acres of green fields, but it is simply intolerable within the narrow limits of brick or stone-bounded villa gardens. With the entire garden furnished on the mixed method, that is, with herbaceous plants chiefly, blooming more or less all months in the year, it will lack the rich summer brightness and autumnal glory of the bedded-out garden. But by way of compensation, it will ever be adorned by some flowers. Still I do not care to put one system of furnishing against the other. (Hear, hear.) Where there is but one flower bed, mix the flowers ; where there are two, mix the one and mass the other, and so on, in any proportion that suits the means or commends itself to the taste of our readers. But so many of the old-fashioned flower garden plants have disappeared that it may be well to recall a few of them to villa gardeners. A grand display may be made with herbaceous or alpine plants, bulbs, and annuals, without a tender plant at all. The following are a few of the families, rich in floral treasures, which used to fill our gardens in the olden time, without a Pelargonium, Heliotrope, Verbena, Petunia, Ageratum, Lobelia or any such thing :—Achillea, Aconite, Alyssum, Anemone, Anterhinnum, Aquilegia, Arabis, Aster, Auricula, Aubrietia, Bellis, Campanula, Centaurea, Cerastium, Cheiranthus, Chelone, Convallaria, Dianthus, Digitalis, Delphinium, Draba, Epilobium, Fritillaria, Funkea, Galanthus, Gallum, Gladiolus, Gentian, Gnaphalium, Hyacinth, Helianthemum, Helianthus, Helleborus, Hepatica, Hypericum, Iberis, Iris, Linaria, Linum, Lupinus, Lupinaster, Lychnis, Lysimachia, Mimulus, Monarda, Muscaria, Myosotis, Narcissus, Œnothera, Ornithogalim, Orobus, Papavera, Penstemon, Phlox, Polemonium, Pansy, Potentilla, Primula, Ranunculus, Saxifrage, Scabious, Scilla, Sedum, Sempervivum, Tulips, Veronica, Yuccas, and Vio

Add to these patches or triangles of such cc n

annuals as Nemophilas, Stocks, Asters, Zinnias, Marigolds, Clarkias, Collinsias, Saponarias, Silenes, Godetias, Gilia, Eschscholtzia, Leptosiphon, Portulacas, Virginian Stock, Nasturtiums, Sweet Peas, and the ever-welcome Mignonette, Sweet Alyssum, Candytuft, Hollyhocks, and Dahlias, with whole hosts of Cloves, Carnations, Pinks, Sweet-Williams; and the garden can be furnished profusely without a so-called bedding plant at all. Then a great deal more might be done now with these common things than was done in past times. Manure in the flower garden, unless for prize Dahlias or Hollyhocks, was almost unthought of twenty years ago. The flowers were kept clear of weeds and tied up—that completed their culture. Now, by enriching the soil and massing, if need be, some of the old biennials and hardy annuals, much better results may be reaped. But already I have exceeded calendarial limits on this matter, so hasten on to advise an instantaneous raid on all weeds. A deep scarifying of all vacant spaces, preparatory to their being filled with new beauties; the staking of all such plants as Hollyhocks, tall Phloxes, &c., before they get twisted with the wind; the removal of winter and spring plants and bulbs, preparatory to the introduction of so-called bedding-out plants, the mowing of grass, clipping of edges, cleaning of gravel, &c. In fact, a general clear up before the reception of new furniture, or the enlargement of old favourites. Choice patches or beds of Anemones, Ranunculuses, Tulips, or Hyacinths, must not, however, be hurried away. It is better to prolong their beauty with copious waterings. The coming guests can hardly excel the glory of the parting ones. And much evil is wrought in floriculture by speeding the parting guests too much. Better let the welcome seem cold, than precipitate the leave-taking. When such plants must be got out of the way, it is best to move them bodily, earth and all, as much as possible, and plant them at once elsewhere, to ripen the leaves at their leasure, and thus lay the foundation of next season's beauty.

Having made all things ready, do not begin to plant out Pelargoniums, Verbenas, &c., till after the 20th of May, nor then unless the weather be genial. Then begin with the hardiest plants first, such as herbaceous Calceolarias, Verbenas, common scarlet Pelargoniums, Petunias, Ageratums, finishing with variegated Pelargoniums, Dahlias, sub-tropical plants, possibly by the second week in June. "Somewhat slow advice," I fancy I hear Mrs Prince say, but sure, Madam, "Burnt bairns dread the fire," and experienced gardeners the frost.

THE FRUIT GARDEN.

May is a trying month in this department. Our entire fruit supply for twelve months hangs on its sweet, or shall we say fickle breath. Let it blow hot upon our trees, and all is well; cold, all is doubtful; very cold, the fair promise of a full crop is blighted, all the tender fruit wrapped in black death shrouds; and even if May weather is all that can be desired, there are other enemies that come forth to do battle with us for our fruit in May. Notably we have three great hosts to contend with—the aphides, the grubs, and the birds. The former eat up every green thing if not destroyed. They even come before the leaves and before the fruit, and lie in wait on the bare boughs like beasts of prey seeking to devour the unfolding leaves and the embryo fruit as it peeps forth from its floral wreath of beauty. It is downright cruelty to the trees to allow these monsters to attack our baby leaves and fruit. The aphides must be instantly crushed, swept off, dozed to death, if first class fruits are to be gathered. And then those horrible "worms in the bud," the grubs or caterpillars. They prefer—fancy their impertinence in having a preference!—these gourmands prefer Apricots and Pears. There they are waiting for the leaf to unfold. How they must hate the fly for presuming to eat it beforehand! But these green or black-eyed monsters like to see the leaves escape the sharp bite of the aphides. No sooner, however, does it unfold itself to the sun, than these devourers quietly take possession, and either eat it up, or use it as a living winding sheet to take a nap in. And by-and-by, when they awake to a new life, they simply eat their way through it, and away they go, the scamps! Crush every such leaf gently with finger and thumb, and then kill the daring intruder, and set the leaves free to nourish your fruit and strengthen your trees for the next crop.

Then there are the birds. Don't kill the birds in villa gardens if you can save your fruit without. Frighten them away; net up your trees in blossom, pepper the blooms with soot to make them obnoxious to the birds. And if none of these expedients prove effective, then the question may arise in some localities, Birds or fruit—which? Well, every one must answer for him or herself. A compromise is possible. Both in moderation may be enjoyed.

The trees thus protected from injury will need little else during the month. Both disbudding and fruit thinning are safer deferred till June. Protection should not be removed until then. If moveable, so so much the better, only employ it when necessary. If boughs are used, they gradually remove themselves, a leaf at a time.

Late planted trees may require watering, and all fruit trees would do better and swell off larger fruit if their roots could be mulched, as it is called, that is, surfaced over to a depth of 3 or 4 inches, with a layer of half rotten dung. Where this is impossible, the next best thing is to scarify the surface over the roots. See that all ties and stakes are secure, and that dust, nor weed, nor untidiness of any kind, mars the unique beauty, so rich for the present, so full of hope for the future, of a well ordered, properly furnished fruit garden in full flower.

THE KITCHEN GARDEN.

ial efforts should be made to forward supplies ything in this department this season. The has made such a clean sweep of most things, ere is an actual dearth of all kinds of vegetables. st neighbourhoods the frost made short work Brocoli, cutting the whole of it down in one or ghts. Autumn planted Cauliflowers also suf- severely under hand lights or cloches. They better under the brick-sided protectors. These to have been in requisition for the last two s in forwarding spring sown Cauliflower plants, t they may prove almost as strong and as early autumn ones. Make a fresh sowing of Cauli- . Prick off Celery under protectors, or hand s, and sow again under the same shelter for the crops. Make another sowing of Brocoli, ls Sprouts, Borecole, and Cabbage for Coleworts. out the early sown plants on rich sheltered beds, es apart, as soon as the plants can be handled. Cauliflowers, under glass, earth up with rich re, and water freely to enlarge the size, and ı growth.

rots.—Hoe and thin as soon as ready, make er small sowing to draw young. Hoe also en Parsnips, Beet, Salsify, and Onions, and arly, from 6 to 12 inches apart.

ks.—Plant out on rich ground as soon as they e handled.

s.—Sow twice or thrice during the month such roppers and well tried sorts as Ne Plus Ultra, hire Hero, Blue Scimatar, Champion of Eng- and Veitch's Perfection. If the weather or d is dry, steep the Peas for twelve hours before g. The ground should be rich, but rank re should be avoided, especially in the north, the southerners assert it rains every day, , indeed, it *snows* or *mists*. Stake Peas as soon ly up. The stakes protect the plants, and seem ıpt them to climb.

ad and *French Beans.*—Plant twice during the month in rows, 18 inches or 2 feet apart. Nip off the tops of Early Mazagan Beans sown last November, to throw them more speedily into blossom.

Lettuces.—Sow a pinch of seed of several sorts twice, plant out those that were early sown. Water and cut those under glass.

Mustard and *Cress.*—Sow once a-week in a protector or a sheltered place all through the summer.

Radishes, after this season of the year, must be grown on a bit of sweet, rich ground, partially shaded if they are to be crisp and sweet, and should also be sown every week.

Round Spinach.—Sow once a-fortnight in drills 1 foot apart.

Turnips.—Sow weekly if a constant supply, sweet and young, is required.

Potatoes.—Keep clear of weeds, stir the earth among, and mould up into a flat ridge as they advance in growth.

Prepare trenches for Celery, warm mounds for Vegetable Marrows, ridge Cucumbers, and Tomatoes, which do as well or better in warm localities, pinned down against the moist earth as set up against a scorching brick wall.

It may strike the villa gardener that there are a good many items, as our forefathers would have called them, in these instructions. And so there are, and for this reason, that though your gardens be small they may be as well cropped and have a little of everything in season, as well as the largest. The only difference is, that while the large gardener sows all these things by the ounce over yards or acres, you must sow the self-same thing in drachms over inches or feet. Besides, full half the interest, pleasure, use, of small gardens arises from the constant occupation they provide for their possessors—always something to sow, plant, cultivate, train, clean, gather. Then the garden becomes a true conjuror's inexhaustible bottle, from which pleasures ever new, and surprises always gratifying, are constantly being drawn forth in refreshing draughts of full and satisfying pleasure.

The Veterinarian.

DISEASES OF PIGS.

WE (*Hearth and Home*) continue to receive scores of letters asking for something to cure sick pigs. We frankly confess that we are as much in want of definite knowledge on this subject as our readers. Pigs grow so rapidly that the system is able to throw off the disease at once, *or*, the disease soon carries off the pig. This is the most marked feature in all the diseases that attack our swine. Indigestion is undoubtedly one of the chief causes of disease in pigs. The pigs do not die of indigestion, but indigestion, sooner or later, in the pigs themselves or in their offspring, gives rise to diseases that often prove fatal. Some of the causes of indigestion are close confinement in dirty pens, impure water, irregularity in feeding, and especially in starving at one period and surfeiting at another. Mr T. L. Harrison, Secretary of the New York State Agricultural Society, an experienced breeder of Suffolk pigs, in a letter published in the appendix to "Harris on the Pig," says:—"My only trouble was in the loss of young pigs, in consequence of the milk of their mothers being too rich." In other words, the young pigs could not digest and assimilate their food. We once had a similar case, and only one. A thorough-bred sow had a litter of nine pigs. She was very fat. It was very cold weather, and one of the pigs got chilled and died; another got crushed to death—probably from being chilled. The other seven did well for two or three weeks, when they shewed symptoms of weakness. It was discovered that the teats of the sow were very sore, and she would not let the pigs suckle. As a substitute, we gave the pigs some new milk from the cow with a little sugar in it. In a week or so the pigs recovered, and so did the sow. But, unknown to us, the attendant continued to give the new milk and sugar, and fed the sow liberally on corn-meal gruel at the same time. In a week or ten days, the pigs were taken sick. They were very weak, and looked as though they did not get food enough. Then a violent diarrhœa set in, and three of the pigs died. A *post mortem* examination shewed no diseased organs. "What can be the trouble?" we asked the man who took care of them. "The sow is so fat she does not give any milk." When we found that they were getting new milk from the cow we came to a different conclusion. "They are getting too much food, or rather it is too rich." "But they look as though they were starved." "And so they are. The food passes through them undigested. It is not converted into blood. Do *they get plenty of fresh water?*" "They have all the milk they will drink." "Yes, so I see. There is some in their trough now; but do they get water?" "I give the sow some slops from the house, and they drink with the sow." "Well, get a little fresh water." He did so, and the little pigs drank it greedily. And from that time they began to amend.

Our rule now is never to let any pig, young or old, be without access to fresh water. If they do not need it they will not drink it, and if they do need it they ought to have it. The trouble with these pigs was this: when the teats of the sow were sore they did not get food enough. Then, with digestive organs weakened by starvation, they received too rich, concentrated food, and the stomach could not digest it. When they got plenty of water, and the supply of new milk was stopped, the food was less concentrated, and

ɔre likely to be digested and assimi-
tion followed by too rich food, pro-
ıdigestion and derangement of the
The offensive discharges aggravate
ɔle, and perhaps give rise to typhus
so-called "hog cholera," and other
l infectious diseases. If our theory
sease is correct, in trying to effect a
must aim to sustain the animal
till it can throw off the disease. This
ıly chance. First of all, keep the pig
ıd quiet. Cover him with a blanket,
: is a valuable animal, and worth the trouble and expense, give him whisky, quinine, and beef-tea. A pig weighing 100 lb. might have half a tumbler of whisky, and 10 grains of quinine. If he lives so long, repeat the dose every four hours, and continue to do so until he gets better, or dies. Do not give him up until he is really dead. We once had a pig that was apparently dying. We covered him with a blanket, and threw hot chaff from the steamer around him and over him, and left him to his fate. Going in less than an hour to see if he was dead, we found him, much to our astonishment, walking about the pen and looking for something to eat.

The Dairy and Poultry-Yard.

FACTS ABOUT INCUBATION.

WE are informed by M. Tegetmeier that, in breaking a number of eggs into a basin, a small circular speck may be observed upon each yolk. We learn from M. Tegetmeier that this speck is the rudiment of the young chick, and the construction of the egg is such that, on whatever side it is turned, the rudimentary germ is always uppermost, so as to receive the heat from the sitting hen. The mechanism by which this is managed is very simple :—The lower side of the yolk is weighted or ballasted by two heavy twisted masses of very firm albumen, termed the chalazæ, which keep the germ constantly uppermost. Contrary to general belief, these ballasting weights are found in all eggs, whether laid by pullets or old hens. If an egg has been set upon for even a few hours, the size of the germ is increased, and if left in the nest of a sitting hen for twenty-four hours, small blood vessels may be seen forming a beautiful zone around it. The yolk, like the white, is composed of concentric layers, which may be seen when boiled hard, and from the germ a tube runs to a central hollow, often noticeable when an egg boiled hard for salad is cut across.

When a fecundated egg is placed under a hen, or deposited in an incubator, and subjected to a temperature somewhat above 100 deg., the germ undergoes a remarkable series of alterations, being gradually developed into the perfect chick. During the period of incubation, various changes occur. The air-vesicle at the end gradually becomes larger in proportion as the water of the albumen evaporates through the pores of the shell. During its development, the chicken derives its nourishment chiefly from the yolk; and shortly before birth the remainder of the yolk is drawn into the abdomen, and passing into the digestive canal, constitutes the first food of the newly hatched animal. During incubation, the blood of the chick is aërated by passing through a series of vessels in a temporary respiratory membrane which lines the porous shell; this makes its appearance on the third day, and gives rise to that opacity of the fertile egg which may always be observed. It is not until the nineteenth day of incubation that the beak of the chick ruptures the enlarged air vesicle, and it then only commences to breathe by means of its lungs. This is accompanied by a peculiar sound known as "tapping," which is merely respiratory, and is not caused by contact of any kind between the beak of the chick and the interior of the shell.

Hunting, Fishing, and Shooting.

*CARRICK SPORT.**

By "THE OLD SPORTSMAN."

HEN the Tweed was in a dwindled state last summer, a sharp London r, who had been boasting of the sport ade a far worst hit than daft Hugh, ı asked what on earth could be caught w, quickly retorted, "plenty fine fresh ."

the law forces the removal of nets, ers, whether clear or flooded, afford ıty amusement to salmon rod-fishers. bright water, during the whole netting a keen-eyed watch is placed to give of every ascending fish to his ı of the cobble, who at once surround their nets. In flooded or turbid hey have constant draughts—relays of ng thrown out without ceasing, giving ıl hardly a better chance of escape.

ı grouse shooting, the autumn before ıccidentally) met the guardian of the ıg shootings and river. He was a e of the old-fashioned game-keeper, onsiderably above the "three score ıd ten," yet hale and hearty. Poor he began at once to lament the ruin ıce famous river. When congratulat- on having made a good bag so early in I said, "Well, I suppose you would ill a good salmon than twenty brace ıe." "Aye," returned the old fellow, ıstically, "than fifty brace o' them." r salmon angler, with the true mettle will echo the septuagenarian's senti- and is there not some cause for ng when the season's pastime is cur- ı the short space of time between the noval of the nets and the end of the fishing year? Last autumn, when the nets were taken off on the 10th of September, there was scarcely a drop of rain till nearly the middle of October, at the end of which month our rod-fishing ceases, giving us little more than a fortnight's good angling for the whole year!

The October floods of the Stynchar came pretty regularly, sometimes allowing the river to empty itself between the large "spates." When unbroken, heavy water lasts without intermission, the fish are so much knocked about that they become dull and languid, until they have been given a rest by a lowering of the river. Our first flood, about the 10th of the month, was from "bank to brae," and the pools were not in fishing order until the afternoon of the second day. The river was even then in far too tumultuous a state to suit my taste, but my second son rose a salmon twice, with a large showy fly, in the "slack water" of our mid-pool, named the "Scaur."

This "wheel," as it is called, is rather confined, but very deep, and when the river is large, shelves off on either side into shallow eddies, very alluring to fish when the force of the current prevents their keeping the main stream. No variety, in either size or colour, could tempt this salmon to shew himself again, and not another fin would stir in any other part of our water.

On the next morning, before breakfast, the same rod rose the fish of the previous day; and the river having lowered in some measure by mid-day, I took my rod, giving him too changes of fly, without success. As a last resource, I gave him the "wind over" (described in "Rocks and Rivers"), which i

tinued from page 320.

duced him to give a fine deliberate roll from the bank between the deep and shallow water. The fish was, however, again stubborn, and my only other rise was a sea-trout, attracted by my salmon fly in the still water of "Dub-a-nee," our highest and choicest pool, which I landed.

At daybreak, my son again found his way to the "Scaur," when his fish came up so keenly that he felt certain of a "fix" next time. He was only 8½ lb. weight, but proved a fine clean salmon, having made spirited play for fifteen minutes. This was counted our first fish of the season, for we agree with the Fishing Guide of the Tweed, in his distinction of terms. On an Englishman's landing what he called a "fish" on the bank, the old man gave it a contemptuous kick—muttering, "ye dunna ken a bit gilsh whan ye see ane afore ye."

More rain fell, and the water rose high again. As usual, my son was at the bank of the river by daylight. In "Dub-a-nee," he hooked at the first offer another clean salmon of 9 lb., and late in the day, its fac-simile. The first was easily landed, but the fish of the evening made several strange gambols, ending by boring round a tree, surrounded by an eddy, on the opposite bank. This fish would have been lost, without a doubt, if a spectator had not been able to untwist and set it free. An old farmer wandered down from his turnip field, was satisfied the angler had caught only a branch, and asking no questions, quietly returned to his work. The next day, on being "chaffed" for his want of interest in the sport, retorted in his Ayrshire *patois*, "I thocht it was the tree ye had cotched."

The first rain brought chiefly small fish, but the giants were not long in following. October was now advancing, and the first night frost-whitened the ground after a day of heavy showers. Although the pools were in capital order, the night rhime effectually prevented the fish, before breakfast, from rising to the most tempting changes of fly. About noon, however, when the sun was warmest, a light breeze and fleecy clouds gave promise of a favourable day.

We divided the water, my son taking the low pools, named the "Duckat Wheel" and the "Bridge Wheel," while the "Scaur" and "Dub-a-nee," the higher ones, fell to my share. As the "Scaur" was well sheltered from the noontide sun, I was anxious to go over "Dub-a-nee," in order to take advantage of the clouds floating lightly in the sky, fitfully shading his beams. Unlike my usual custom in autumn, I began with a large hook, orange, yellow, and black body, having a fine mottled, dark turkey wing. About twenty minutes are needed to fish "Dub-a-nee" properly, and, after the last cast had been made, of course it disappointed me that no fish had deigned even to notice my lure.

Sitting down on the bank, I chose out of my fly-book a much smaller hook, composed of a claret and purple body, and red turkey wing. With this enticing fly, all the well-known eddies and sunk rocks were carefully searched, bringing me to the calm water at the foot of the pool. The whole of "Dub-a-nee" needs a long throw, but its broad shallow requires the full pitch of an expert hand.

I had cast within a yard of the opposite bank, bringing the fly round to the gravel on the near side, when a splash broke the still water, and the head and shoulders of an enormous fish tightening the line, made my heart beat. To shorten my line and get opposite his head was the work of a moment. The salmon, however, seemed quite disposed to give "fair play," for it only leaned its ponderous weight against the single gut, and steered steadily into the stream. My wish now was to coax him up the pool, for at the foot, only 50 yards from the place where he was hooked, was one of the most dangerous bits of water in the whole fishing beat. Slowly, and with much trouble, I gained yard after yard of the up-stream, until nearly opposite the tree which had so troubled my son.

Having now a good stretch of clear water below, I ventured to turn his head, but he quickly resented the liberty, by dashing down with tremendous speed, requiring all my

fforts to appease him before he reached the angerous ground which had wrecked the iopes of many a fisherman. I was again obliged to resort to the slow process of wearng up the river; but although the fish had been hooked for an hour and a-half, he was as fresh as when he took the fly. A step behind was the river watcher, in his easiest attitude, determined to see the game played out.

A bluff, honest, fellow, of few words, he did not speak nor trouble me till he was addressed, when he brought cheering news of my companion below. "The young gentleman landed, a short time since, a beautiful clean fish in the 'Duccat Wheel,'" quoth he, encouragingly.

An hour more, and my son, attended by the game-watcher "Sandy," and a young river prowler, from Calmonel, joined our company. A few minutes' rest was then given me, when my son took the rod; but even with this respite my arm was rather stiff after four hours' play of so heavy a salmon.

"That's the largest fish I have seen on a rod for several years," remarked the watcher, taking a keen interest in the proceedings.

My son proposed stoning him, which advice was eagerly seconded by the Calmonel water-spirit. The watcher did not approve of this measure, however, and my consent was reluctantly given. The fish had never fairly sulked, and I always found it possible to move him at will, so that patience only was needed until he was so far subdued as to be safely turned down stream, and led past the rocks and sunk stumps of trees on the far side.

Large stones were now flung thickly at our victim, the game-watcher joining in the exciting "bicker." The fish, maddened by his persecution, started, winced, and then struck for the opposite shore, down which he darted with the speed of an arrow. No line could then curb him from the treacherous rocks, and getting on the far side of one, close to the gravel there, a foot above the surface, a scrape on its ledge cut the line!

The Calmonel "Kelpy" was off in a twinkling, but the rest of the party remained to talk over the mishap. The game-watcher thought, from the length and strength of his play that the fish must have been hooked by the body. He had never seen him clear of the water, though, and the river guardian, who had twice watched a clean leap from the surface, was of a different opinion, maintaining that he distinctly perceived this splendid salmon was fairly fixed by the mouth. The sequel will shew that in all likelihood he was correct.

A fine dry night reduced the river to the smallest trim possible for fishing. The chief prospect of success, therefore, lay in trying an early cast, when my son hooked the only salmon he rose in the pool of Dub-a-nee, and in five minutes he was stranded on the shelving shingle. The fish was beautifully shaped, although his time in the fresh water had slightly tinged his colour with yellow. He rushed heedlessly round the pool, with the furious folly of a Thames chub, and was, in consequence, tired out so easily.

Rain fell in ceaseless torents until the following day at noon, when the clouds broke and the sun shone out gloriously. Of course, a tremendous flood followed, which prevented fly-fishing for twenty-four hours. Even after that time, there was so great a rush of madder-brown coloured water, that I chose for my son's line a large rather bright spring-fly. Three feeding salmon appeared at intervals in Dub-a-nee, two seemed about 12 lb., and one in the far eddy we estimated about 20 lb. in weight. The two lesser fish would not notice the lure, but the moment the long sweep reached the eddy, the large salmon sprung up beautifully and "fastened."

To play such a fish was the very luxury of angling. He neither sulked nor spurted, but did his best to escape in fair battle, and in half an hour was safe on the bank, the angler having steadily refused Sandy's eager request to strike him with the gaff. He was a fine broad fish of 21 lb. One more sluggish "break" in the evening was all that followed, and the water being so large and muddy from the discharge of the moss-burns, I was contented with the humble post of spectator.

At the close of this paper, I may mention

that by far the best cloth come under my notice for shooting, fishing, and country wear, is made in the Island of Harris. The cloth is of various shades and colours, and is dyed by the water-lilies, lichens, mosses, &c., with which it abounds. Lady Dunmore generously takes the charge and trouble of the depot of cloth herself, for the benefit of the islanders, kind and prompt attention to requests for patterns being always given by applying to the Countess-Dowager of Dunmore, Dunmore, near Stirling.

The Country Gentlewoman.

THE DECORATION OF DRAWING-ROOMS AND DINNER TABLES WITH FLOWERS.

CHAPTER II.

[IS illustration is one of Miss March's stands, prettily arranged with flowers n fronds for the stems of the stands. A r should be used, and twined artisti- ound it. Japanese honeysuckle will be suitable for the purpose, also small ivy, uch a climbing fern as Lygodium looking object. In dressing a stand, the pretty Adiantum, or Maiden-hair fern, as it is commonly called, should be introduced amongst the bright colours of the flowers; but it should not be put in until it is really requisite to complete the decoration, as it fades sooner than the flowers. There are

Miss March's Prize Flower Stand.

ns. The custom of arranging fruit ıe flowers does not seem so prevalent some little time back, when bunches ıpes were employed to hang over st the fern fronds. The fruit seemed ıge the whole appearance into a heavy- some pretty glass stands, with reflecting glasses at the base, on which may be placed a few water-lily blooms and leaves. This is refreshing and pretty. It has also some small baskets suspended from the centre dish, which, filled with the pretty Is

gracilis and a few rose-buds, or any small flower, has a very pretty effect. The stands should be filled with wet sand, or water with a lump of charcoal in it. This, of course, keeps it in a state of purification, and in it the flowers will keep longer than in pure water, which has to be changed so frequently.

In the place of stands for the dinner table, plants are now almost universally used, and some of them have a very pretty effect. Light-foliaged palms and ferns, with flowering plants introduced as a relief, are among the most suitable. Placed in the new china pots and mossed round, they are very pretty. I have seen a sort of miniature tree fern used for this purpose, formed by placing in a small piece of a dead stem of a tree fern and covered with Selaginella; and it really is charming for the purpose, and sets one wondering whether it really has grown so, or been arranged by human hands. Some of the light-looking foliaged Dracænas are very suitable. The leaves of Dracæna Macleayi are of a bronzy metallic appearance, and form a striking contrast amongst the bright green of the fern fronds. — *Annie M. Williams, Victoria and Paradise Nurseries, Upper Holloway.*

THE

COUNTRY GENTLEMAN'S MAGAZINE

JUNE 1871

THE WHEAT MAGGOT.

IN the agricultural reports for the last two months, the young wheat plant has generally been described as unusually close-planted, vigorous, and good-looking, although a closer inspection towards the end of March would, in too many instances, have shewn that the maggots were at work, devouring the hearts of the young plants, and threatening their destruction to even a wider extent than the devastations which they caused last year; when many fields which at first promised well, had to be ploughed down, and re-sown with barley or other crops; while in others that were left, large portions were so bared of wheat plants, that, as the season advanced, they presented little but an exuberant growth of the commonest and worst of field weeds, which had either to be mown down along with the thinly interspersed green wheat stalks, or left to perfect and shed their seeds in such profusion that the time allowed by the old adage of "seven years' weeding after one year's seeding," will scarcely be adequate for restoring the land to its previous cleanness.

In our volume for October 1870, page 245, we described the very deadly ravages and transformations of this tiny insect pest, from the nearly full grown maggots, about the middle of May, through the crysalis stage of their existence, which lasted about five weeks, until they were transformed into flies, the first of which appeared on the 22d of June; and from that period till the ears begin to shew their ripening tints, they might have been seen in more or less abundance in every wheat field. Having in course of a country excursion during the past month, visited an agricultural friend whose wheat crops had been much thinned by the maggot last year, and in whose fields we then picked those which formed the subject of the foregoing experiments, the question naturally arose, Well, what of the wheat maggot this season? And the reply was, "They have not yet been seen, and I hope we have got rid of them, as the wheat crop never looked better." This last assertion appeared to be fully confirmed on looking from the public road, over the wheat fields, but a closer inspection revealed a very different state of matters, for although from the effects of recent sunless and moist weather, few or almost none of the leaves had become withered into brownness, yet many of these had assumed a flaccid, reclining, bluish-green appearance, coupled with the absence of fresh, upright, young heart-leaves, which shewed unmistakably that the enemy was at work. On carefully digging up a plant, the young maggot was easily detected, eating its way in the heart of the underground stem, the destruction of which progressing in proportion to the size and age of the devourer; but few of the maggots had then attained to more than half the size which they exhibit when full grown, or just before they change into their crysalis form. Subsequent inspections of wheat fields

various parts of the country have realized our worst anticipations in regard to the disastrous abundance of the maggots which, having in many instances destroyed the original shoots, are now transferring their ravages to the young side growths, or tillering shoots, and not unfrequently to the nearest plants which had previously remained unscathed. Growers should therefore lose no further time in examining into the state of their wheat crops, and ploughing down all that are hopelessly injured, in time, to admit of re-sowing the ground with barley. It is highly probable that if the maggots are thus prematurely deprived of nutriment, their existence may be terminated before they attain to the fly, or breeding stage, so that their propagation would be materially checked.

We regret not being able to give the proper scientific name of this formidable crop destroyer, although we have sent specimens of it, by invitation, to celebrated national museums, as well as to several eminent entomologists with this intent; and having discovered specimens with a reference number attached, in another national museum, we found, on turning to the catalogue, that the name was not filled in.

ARE FARMERS ALWAYS GRUMBLERS?

IT is the popular idea that farmers are always grumbling. Not any kind of weather, nor any sort of bargains, are ever to their taste. If we have no rain for a short time, then there is complaint about drought; if moisture falls copiously, the land is being saturated to an extent that will rot the cereals or cause a second growth in potatoes. They have bought their stock too dear, and have sold it too cheap; or, having purchased at a moderate figure, and sold at a high one, they discover that the "keep" of the animals was very expensive; or else—and this is more galling than all—that with a little more higgling and hanging-back they could have got even a higher price than they asked and received. This, we say, is the popular notion about farmers, and while we cannot deny that there is a modicum of truth in it—a little grain of leaven in the accusation—it is by no means sufficient to upheave the whole lump. We have found farmers, as a rule, of quite a different turn of mind, men who preferred to look upon the bright side of the picture rather than the dark. The black cloud ever had one little streak of silver lining in it for them. If the grass had been stunted and withered by the sun's rays, these had given a vigour and a golden tinge to the barley, which enhanced its value in the eyes of brewers. If hay could not be obtained except at exorbitant rates, straw was plentiful, potatoes in abundance, and turnips a medium crop. By cutting the first with the chaffer, pulping the latter, and mixing both up together, the loss of the hay was not much felt, while a lesson in economy was gained, that could not fail to be profitable in other years of less scarcity of grass. Then the potatoes formed a first-rate supplemental crop, paying better in the feeding of them to cattle, than in the sending of the tubers to the large central markets, where, in consequence of their bountifulness, there was little demand for them, and the rates obtainable small.

We have always found farmers ready and willing to afford every information in their power (although this, it would appear, is not quite the experience of the enumerators appointed to collect the Agricultural Statistics of Great Britain, in so far as some parts of England are concerned—"'Tis true: 'tis pity; and pity 'tis, 'tis true): and often, in fact, trying to make things look better than they actually were. At all events, we have seen in our wanderings over the country, which have

extended, as many farmers who made
s appears better than they were, as we
met others who were never satisfied
he mercies Heaven vouchsafed, however
iful they happened to be.

igriculturists have a fair crop, the great
ity of them, instead of grumbling about
being larger than it is, will be proud
eak of it as excellent, and generally a
r feels elevated when he can boast of
g obtained the top price in the market;
e seldom fails to do so when he has the
e.

grumbler he is not, any more than the
iant or trader. If his crop fails, he de-
it—just as Antonio, the representative
ian merchant of the Rialto, grieved, and
had his life sacrificed for the loss of
ips. It is to be regretted, that in these
enerate days," there are merchants who
ciate and profit by the destruction of
s and valuable lives; and such men,
nk, are much worse than the rural sub-
vho are almost invariably described as
being satisfied. In proof that farmers
f an opposite disposition to that with which they are generally accredited, we quote, in its entirety, a paragraph from a correspondent of the *Albany Country Gentleman*, who signs himself "T. C.," and dates from Chattanoga, Tenn. :—

A PROLIFIC FLOCK.—From the *Country Gentleman* I have gained much information, having its bound volumes for many years previous to the "late unpleasantness," and being a subscriber now. I have had, as I think, such great success with a small flock of sheep, that I have determined to give you the result. I have seventy-two breeding ewes, a cross from the "Improved Kentucky," impregnated last fall by a Cotswold buck. Thus far, fifty of the ewes have brought me eighty-six lambs, seventy-two of which are living and doing well. Thirteen came dead, and one was killed by falling from a straw pile while playing. With the exception of about one week in January, when the grass was covered with sleet, they have had no feed, keeping *fat* on the meadow, Timothy and clover, which has afforded fine grazing all winter.

There is no grumbling, or cause for grumbling here; and all farmers who are as careful and conscientious perusers of, and contributors to, agricultural newspapers in this country, act upon the same principle as the trans-Atlantic "T. C."

CONDITION OF THE RURAL POPULATION.

IE condition of the agricultural labourer on the north side of the
l has been much discussed recently,
quent upon the publication of Reports
Commissioners on the Employment
men and Children in Agriculture. Im-
l into the discussion, we have had
t deal about the social arrangements
orality of the rural population which,
ce leave to say, is much more popular
ccurate. We are told by some of our
nporaries that bothies are the hot-beds
, that the districts in which they are
ent are noted for their vice, and that
nties where the cottage and the kitchen
l prevails, marriages are more fre-
and illegitimacy less. This has been the delusive idea for many years, and we are sorry to see it again cropping up.

Ten years ago, when the bothy question was being made a stalking-horse of for politico-ecclesiastical purposes, a very careful inquiry had been made into the condition of agricultural labourers in Scotland, and the unbiassed conclusions arrived at were quite opposite to those promulgated by heated orators, some of whom had never seen the hovels they denounced, and whose experience about the "patriarchal system," as it was called, was *nil*, while the best informed of them founded their right to abuse the bothy upon very slender materials indeed. When so much that is misleading is being spoken about the condition of rural lab

ers in Scotland, it seems very necessary to repeat the conclusions at which we arrived, a decade ago, and within that period there has been, to our knowledge, a very material change for the better, except in the case of illegitimacy, the per-centage of which cannot be said to have altered much. But religious revival meetings in the north have had, in some years, much more to do with bastardy than bothies ever had. And now for the conclusions :—

I. That farm servants are not, as has been asserted, in a worse position than they were say fifty years ago ; but that they enjoy, in common with the rest of the working classes, and to the full, the pecuniary advantages which a prosperous and progressive civilization has conquered.

II. (1.) That the bothy is by no means so common a method of housing ploughmen on large farms as the public has been led to believe. (2.) That bothies are not all, nor even the majority of them, of that terribly disgraceful type which has been held up to public reprobation. (3.) That bothies do not necessarily tend, as has been alleged, to immorality, the per-centage of illegitimacy where they most prevail being greatly less than in other agricultural counties, where they are the exception. (4.) That, not being immoral *per se*, the bothy is one of the best methods yet devised for the accommodation of unmarried ploughmen on farms whose extent implies the necessity of several unmarried men —it being premised that the bothy is not a dark, dirty hovel, but one after the fashion of the improved ones to be seen in many places in Fife, Forfar, and Aberdeen.

III. That of all modes of housing farm servants, that known as the kitchen system is the most obnoxious to the charge of immorality ; that so far as illegitimacy can be said to be a consequence of any particular arrangement, it is a consequence of this arrangement.

IV. That a mixture of married and single men on farms would appear to answer best—the married men having cottages in the vicinity of the steading, the unmarried men living in bothies.

V. That, judging from the condition of the small farmers and crofters at present in existence, the increase of small farms and crofts, as some have recommended, would be attended with little benefit to the class in whose interest it has been proposed to reintroduce them ; while, by the break-up of large farms, the loss to the community generally would be great.

Another statement made at that time was, that the counties in which the most illegitimacy prevailed were those in which were fewest marriages, consequent upon what was termed "the enforced celibacy," caused by the existence of bothies. This was conclusively disproved by an appeal to the statistics of the Registrar General, which shewed that in the counties where this form of immorality most prevailed, there was one marriage in every 166 of the population; whereas, in those counties where it was least obnoxious, there was only one marriage in every 192 of the inhabitants.

THE EDUCATION OF FARMERS' SONS.

By Rev. B. E. DWARRIS, M.A.*

THE rev. gentleman, whose paper was entitled "On increasing the facilities for the education of farmers' sons," pointed out how few were the facilities which had hitherto existed for enabling the sons of farmers to secure anything like the class of education that was now-a-days presented to all other classes of society; and also described the kind of training which he deemed it desirable that farmers should be enabled to obtain for their boys. Until the last twenty-five years no common action had been taken, no inducement afforded to arouse him to give his sons any education broadly superior to that which was sufficient for his own labourers, befiting the high level of his rank in society, and commensurate with the positive requirements of his calling. In respect of his professional requirements, it had been well said that no farm could be more productive to the farmer than that which was bounded by the ring fence of his own skull ;

* Paper read before the Hexham Farmers' Club.

at the English farmer could not rise to l height of the position made for him by wth of science, until he received a sound training, followed up with a thorough g for his business. He must have all sources of science at his command, larly those bearing on agriculture, try, hydrodynamics, geology, animal getable physiology, and the rest. He sed upon them the importance of a man having the powers of his mind hened at school, and to his being l to habits of close and accurate thought, afterwards he forgot any detail of his , yet if he carried away from school, sharpened and polished as an instru- or use, and a few first principles which stand by him all his life, would he gained nothing? The distinction he make was all-important — that real ion did not mean making a farmer but a man. That was the diffierence n a general education and a special g or a professional training. Each proper place. Let them first make a r a real man would make into a farmer, hant, a citizen, a doctor, a lawyer, or g else afterwards. On that depended stinction he would make between a for boys and a college for young men school should make the boy into a the college should make the man into ssional man.

TIONAL FACILITIES STILL REQUIRED BY NORTHUMBERLAND FARMERS.

dvocated home education for boys up een years of age, by which time they have been grounded, in the public tary schools, in the elements of an education as well as a religious edu- in arithmetic, the elements of mathe- grammar, history, and geography. uld have got to the head of the class, ve passed the sixth standard. Then e desideratum—the great want which re seeking to meet—namely, a large, ablished public boarding school, which in a rural district, so as to be in a at once physically and morally healthy, where the teachers should be of a high order, possessed of the credentials of public teachers; where the teaching, though still of a general and not of a professional character, should be strictly limited to the requirements of the agricultural or commercial class of boys, who were not destined to continue their school education beyond sixteen years of age—that was, in fact, what was technically called a second-grade school; and last, though not least, where the cost of board, lodging and tuition not only should come within the average tenant-farmer's reach, but would even tempt him to send two boys at the same time. In dwelling further on these several requirements, he submitted that it should be a boarding school, as, at the age of thirteen, boys were better away from home and the companionship of half-grown servant lads. It should be a public school, with a great name, and, if possible, old traditions. It should be a large school, for a large school paid better, and could, therefore, offer its benefits at a lower cost; it could command the services of a better head-master, the discipline was better, and it possessed other advantages. It should be amenable to public authority, and the teaching should be such as might attract boys destined for as varied occupations as possible. The necessities of isolated farmers should be considered, and he thought the school should be made easier in its terms to him than to such as lived in towns, and had greater educational advantages. The teaching of this school, then, though it should have agricultural application, should be by no means professional. Leaving the school at the age of about sixteen, the youth might go home for a couple of years, and learn under his father to work with his hands, and get to the bottom and to the end of his father's system; then he should go, if he had the ambition, to a professional college, and secure the highest scientific and professional attainments. Such a college there should be in every county, which the great landowners should have furnished with every appliance of museums, laboratories, workshops, and store-houses of machinery, with competent

teachers, and every facility for the pursuit, on the part of their tenants, of professional knowledge, and for the study of those sciences which bear upon agriculture in their immediate application to the practice of it.

SCHEME FOR SUPPLYING CHEAP AND EFFICIENT EDUCATION.

He thought the educational endowments of the country might be called to their aid for farmers' sons, as they had been in times past for all other ranks of men. The farmers did not want charity or eleemosynary institutions, being well able to support a school for themselves if they had only faith in it; but what he meant was, the school should be got up and nursed in its infancy through some educational endowment. The farmers would pay a reasonable sum for the board of their children, and a reasonable contribution towards their tuition—say £20 a-year for the former, and £7, 10s. for the latter. But in order it that might be done well at these rates, several conditions were requisite, for it was only through large numbers and good arrangements, the best teaching and proper diet could be secured at these prices. The school building must be large, and of some dignity, with recreation grounds; and, besides, the means of exciting emulation and rewarding merit. These were the conditions which the farmers could ultimately maintain for themselves, though they could hardly create and call such a school at once into a dignified existence. They would be aware of the existence of certain Commissioners who had almost absolute control over the endowed schools throughout the country, and who, within the next year or two, had to devise schemes for re-casting any endowed schools they may think fit in such new form as should seem best to suit the wants of the locality or country in which they were situate; and not only so, but they had power to amalgamate two or more endowments, or to make one central school out of several small ones. Here, then, if he mistook not, was opportunity. If there were in the county any endowed school, in a rural district, which either had ampler funds than it needed, or of which the public did not avail themselves to the full extent, let the farmers of the county of Northumberland put in their claim and shew their want to the Commissioners. Let them ask for the school to be converted into a second grade school, of a quality and character which might be offered at a cost which would suit their purses.

He believed the cost of a building for 300 boys would be £15,000, which the trustees might contribute by capitalizing as much of their property as would raise that sum; though the object would be better served if the loan were raised amongst the capitalists of the county, secured by mortgage, a small interest of say 2 per cent. being guaranteed. A proportion of the profits should be placed to the account of the sinking fund for the gradual reduction of the debt, and any balance still remaining might be distributed as a dividend. In the next place, as the cost of teaching would be £10 or £12 per head, to meet the deficiency—£7, 10s. being only charged the pupils for tuition—the trust should give a house and retaining stipends to at least the head and second masters, and their remuneration should be increased by capitation fees. Then the farmer class should enjoy some special privileges, for if the county proprietors subscribed to the school loan and took up the shares, they would not be making an unreasonable demand if they asked that the rate of charge should be made easier to the sons of the agricultural class than to others.

MANAGEMENT AND CHARGES.

The management should be vested in a well-balanced body of governors, representing the traditions of the original trust, the feeling of the parents of the children from time to time in the school, the feeling of the landed interest of the county, who would be represented by the shareholders, and the prevalent ideas of the highest educational authorities of the county. Such a board would be secured if the trustees, the parents, the shareholders, and the University of Durham were equally represented. Having supposed the establishment of a school after

ramlingham type provided for the
l education of farmers' sons, the
on then came as to a special profes-
college of the type of Cirencester,
those sciences which bear directly
agriculture might be studied. The
on Bridge Trust had an available farm
Belford, but how far it could be utilized
e purpose he was not prepared to say.
ad observed, however, named amongst
jects of the founders, "the introduction
ung men into the business of life," as
as the education of boys. However
night be, the professional farm—when
considered the energy of agricultural
ies and farmers' clubs—might probably be much more easily self-created and self-supported than a school. A model and experimental farm might not be necessary; but a good practical teacher of agriculture, and one professor of physical and mathematical sciences, to act also as principal, might be staff enough to begin to gather a few students in a plain and unpretending building. If it seemed to take root, museums, laboratories, and other appliances would probably soon be supplied by the enthusiasm of the county. He would propose that the rate of payment should be half that of Cirencester, say £65, and that would leave a margin, after providing board and lodging sufficient for the real working student, and competent teachers.

CO-OPERATION AMONG MILK PRODUCERS.

CORRESPONDENT of *Hearth and Home* makes a suggestion which we might be adopted in this country also dvantage to farmers. He says:—

ve in a country town, of from 15,000 to
o inhabitants, which is supplied with
oy some thirty or forty different farmers,
of whom live from 2 to 5 miles

The average number of cows kept by
or rather, the average number in milk
ghout the year, is not more than eight
. Probably eighty quarts of milk would
e average daily product of each farm.
average distance travelled, going and
g and making the tour through the
is not less than 8 miles. These
rs usually bring in nothing but milk,
aking the time they spend on the road,
he time they potter away about the
s and at the stores, the delivery costs
including harnessing and unharnessing,
ss than four hours a-day: say one-third
ir whole time, year in and year out,
ys *not* excepted. Fully one-half of the
service of a horse and waggon in devoted to the business. Now let us do a little ciphering:

The year's services of a New England farmer would be cheap enough at 750 dol., one-third of his time amounting to 250 dol. The use and keep of a horse, waggon, and harness, including repairs and renewals, is worth 350 dol. a-year; one-half of this would be 275 dol., making the total cost of delivery 525 dol. This makes the total cost of the delivery of milk, by thirty farmers, 12,750 dol. a-year. If their average product is 80 quarts per day each, and the average price for the year 7 cents, the total amount received would be 61,320 dol., shewing that about one-fifth of the total value is consumed in the cost of selling, to say nothing of the idle habits that are engendered.

Now four active men, with good waggons, would supply the whole population twice a-day, instead of once, and they would have time enough left to collect all the milk on the different roads, doing the whole w : for just about one-quarter of the pr it cost, making a charge of 5 per cent. inst l of 20 per cent. for the sale of the whole luct

The whole of the remaining 15 *per cent. would be clear profit in the pockets of the farmers*— being 300 dol. for each of them. How much more they would gain by being able to remain at home, and attend to their work, would vary according to the kind of farming they do, and the manner in which they do it.

Consequently, if the farmers of a given neighbourhood, say ten in number, living in one section of the country from which the town is supplied with milk, would agree to employ a competent and reliable man to sell the product of their dairies, each one being credited for the number of quarts or pounds of milk delivered by him daily to the salesman, receiving therefor his proportion of the net receipts, every man of them would be benefited to an amount at least equal to a year's wages of a hired man. Their business would be better systematized, they would have more time to attend to home duties, and if the combination comprised a sufficiently large proportion of those who supply the town, they could probably add from one to three cents per quart to the price of the milk, and the whole of this addition would be clear profit.

What is true of a small town is equally true of a large one. If the farmers living along the line of a railroad, over which milk is carried to a large city, would all combine, and run their own delivery waggons in the city, they would add fully 25 per cent. to what they receive under the present system of selling at wholesale to city retailers.

Such a combination would have other incidental advantages that would be of decided value. For instance, their agent in the city, who should be a man of intelligence and of reliable character, would have time and facilities for purchasing their supplies of groceries, provisions, feed, &c., at wholesale rates; also, to dispose of their poultry, eggs, fruit, pork, veal, and other products.

Such a man, of course, would have to be well paid, but he would save in the profits of middle men a great deal more than he would cost, and his services would be in every way a great benefit to the members of the association employing him.

The business of milk supply is simple, and under such a system of organization as we have sketched, is susceptible of being thoroughly systematized, and of being relieved from the exactions to which the plan now in vogue subjects it; and whether it be ten farmers, or a hundred, or five hundred, it is entirely practicable to bring the producer and the consumer so near together that the one will be sure of getting pure milk, and the other of receiving the whole price that consumers pay, less the actual necessary cost of transportation and selling. It is chiefly, however, the case of the supply of smaller towns that we have in view in considering the advantages of co-operation.

EMIGRATION—LESSONS FROM A FLY.

FROM the *Free West*, a new publication, we extract the following article, which, under a parabolical form, conveys a great amount of sound common sense:—

The common house fly is an extraordinary animal. He is thoroughly imbued with strict conservative notions. The domesticated habits which form his character are developed by continuous travel, by the astounding faculties he possesses, whereby he continually increases the accommodation of space by his varied gyrations in the air, his constant perambulations over surfaces vertical, horizontal, concave, convex, round, elliptic, or otherwise: by his capacities of performance head downwards, or his marvellous surefootedness, whereby he can climb along the edge of a mantel, up a four-post bedstead, investigate the cracks in the ceiling, peep into the recesses of party walls, take his

in the sunbeams on the window-sill, nto the heart of a flower, crawl along nder leaf, make acquaintance with the organs of man, and generally treat that able creature as a being of very in- order.

e loves of a fly, as he takes his gay and y course through the air, are numerous portion to his size; the voice of his is a tremendous buzz, the ardour of his it quicker than the speed of man; and is Don Giovanni of the air has quali- bservances, ideas, geometrical proces- and developed combinations, which, they but possessed in a proportionate e by man, would speedily convert that piped into an educated being.

e fly is a most sensible fellow, though imes subject to periods of hallucina- -such as trailing his delicate wings and in a treacle-pot, coquetting with the etrical puzzle of the spider's web, seek- discover that which, when practically ed upon, results in the forfeit of life to igantic schemer who watches from his ge point for the trembling quiver which ndicate the success of the scheme.

great economizer of space is the fly. vards, forwards, round, back again, ng here and there, all levels affording mple opportunity for a footing, no n of his little kingdom unknown, no aled surprise but what he will ferret If he take a liking to a man, how ous is he, in spite of rebuffs, curses, icked attempts at his life, to renew the intanceship he has once established delicate proboscis! He knows more e countless beauties of the hedgerow he farmer who tills the land, or the ho owns it. The thorny bramble never his limbs, for on its points he crawls gerly as a duchess in full fig treading aircase leading to the ball-room. En- ed in the branches of some mighty tree morning, he drops upon the wide-awake sportsman, keeps to his companion all y, gaily roving at times for the extreme of a few second to confab with one of ecies out for a holiday, who has taken up his quarters by the side of a trickling rill, being very fond of the babble of the young waters as they chat their new-found speech to all who care to hear. Making an appointment to spend the evening with his friend, he allows the sportsman to convey him so far back on his return, in the interim examining every stitch and curl of the brim, under and over, in and out, up the bow of the band, and over that mighty hill, the crown of the sportsman's hat. He walks upon the tip of the sportsman's ear, but is gone, to perch upon his shoulder, as he feels the wind of the sportsman's hand angrily brushing by; he crawls to his elbow, takes a lively somersault and cycle in the air, and with a grateful buzz for the help the sportsman has given him, he sails away a perfect rover.

To-morrow comes, and then to-morrow, and then again to-morrow; and like a well-bred gentleman, he returns to town, puts up at his mansion, explores the various chambers, chooses one to his liking, makes himself quite contented, admires the pretty patterns of the chintz curtains, sees himself reflected in the polished looking-glass, crawls over its surface, and attempts to correspond with his own image, which, do what he will, so long as he crawls on, the glass keeps under him, step for step, movement for movement, and leaves him only when darkness kills light, and necessitates a less gloomy surrounding. There are odd nooks and corners of the mansion which the owner thereof is not aware of—sly little cupboards, wherein, not far from the butler's pantry, lie hid a choice selection of dusty bottles, all filled with the cream of the produce of the vineyard. On a wet cork just drawn, the fly luxuriates: he sees strange appearances in the dark—hump-shouldered bottles, long-necked bottles, bulged-bellied bottles, squat bottles, bottles whose under centres cunningly penetrate half way up their bodies, and bottles whose forms are embalmed in a precious shroud of cobweb, sawdust, and dirt. This daring adventurer crawls through the keyhole, peeps up the staircase, sets his wings, and away he goes exploring, till he arrives at the door of my lady's chamber. Oh! naughty fly! oh! wicked intruder!

is not my lady's chamber a sanctuary? Impetuous traveller, beware of the insidious preparations over which thou crawlest, deadly, metallic, and vegetable poisons, awful spears of decoration on which any instant thou mayst be impaled. Mysterious rites of toilette, unheeded by the fly, proceed, as under the door he creeps, his little head turned by the jets of perfume rippling from the miniature fountain. Down the window-sash and outside wall, goes the fly, alighting on the dust heap of the noble mansion, placed immediately, for want of room, under my lady's boudoir. Flies, dead by the dozen on a sticky sheet, greet his gaze, but still the fly explores the dust-bin. He finds some morsel in its recesses which affords him luscious dainties, and upon which he banquets till the midnight hour. Then out he sallies, crawling up a gas-lamp, attracted by the glare: he pitches upon the top of the policeman's lantern, as its circular flame quivers and quavers up and down the doors, the bars, the locks, the bolts, searching for tokens of the burglar's art.

Whatever he wants, he goes where he can best find it. His energies are surprising. He knows it is no use whatever for him to expect another fly will feed him. Has not the other fly got himself and Mrs Fly and all the young flies to provide for? And what will Mrs Fly say to Mr Fly when he returns home and pleads that he could not get anything for the subsistence of the Fly Family because there were so many flies at the precise spot where Mr Fly happens to pitch his abode for the time being. Will not Mrs Fly say that Mr Fly is not a fly, only a common paltry insect, and that Mr Fly should fly to spots where there is plenty to be had for the toil of going, and where none, or very few, flies have hitherto ventured. And will not the Fly Family immediately repudiate starvation, and at once set out in search of the spot where the Fly Family can exist without being a burden to others?

Oh! insignificant Fly! Oh! paltry Fly! if you cannot find your want where you have satisfied it, do what you have hitherto been doing all your life, since you could fly, what your countless evolutions should long since have taught you. Emigrate, Mr Fly, go to those vast solitudes, Mr Fly, which you have hitherto unexplored, which, from your past experience, Mr Fly, you can vouch for do exist—those vast expanses in which you performed such extraordinary attitudes as you gaily led the life of a roving fly.

What are your wings for, Mr Fly? Are they not to convey your body to the best place you can find for it? Will your body go there of itself? Therefore, Mr Fly, consider that, as Nature has provided you with legs and wings, those necessary articles indicate that your life will be, as it is intended to be, a perambulating period in which you must put to use the energies of your body, in such places and positions as may best afford a return for your exertions. For, Mr Fly, if you do not use your wings, but trust only to your legs, you will never know the exhilarating emotions of rapid transit, you will never leave one spot time to replenish itself, until such period as you may return after having patronized other spots, after you have taught that poor unenlightened biped man, the lesson which your ceaseless movements in search of sustenance reads him every day of your life—the lesson of emigration from overcrowded localities.

Where are you to be found, Mr Fly? or rather, where are you not to be found? If the poor uninstructed biped, who, because he will not move to Nature's bounteous spots, starves instead of lives, will not be taught by you, poor humble insect as he supposes you to be, let him consider your manifold accomplishments—let him attempt to walk head downwards across a ceiling—let him try to balance himself upon the edge of a leaf—let him attempt to rival you in speed, or insert his burly body through a small keyhole—let him try to dance the fly's hornpipe—let him dare to insinuate himself into wine cellars, ladies' boudoirs, and dustbins—let him try his knack at crawling down a perpendicular wall upon his hands and knees—let him, with his superior intelligence, reckon himself above the humble fly when he pours horrid poison down his throat to circulate in

his veins and paralyze his limbs—let him vaunt himself as he despises the antics, as he calls them, of a wondrous living mechanism, and doubts its uses—let him be as insensible as you are sensible, as dull as you are lively, as big as you are small, as wicked as you are harmless—let him be and do all these, so that he take your lesson to heart.

What is your trade, Mr Fly? You have no trade. Very well. You have power of a certain kind. What is your first point? To live. Will a trade keep you without labour? What makes trade, Mr Fly? The demands of Labour or not. Can you live upon tools? Can you eat money? Can a fly swallow a pair of breeches? Certainly not. Well then, Mr Fly, as you are a rover, have you not seen the corn growing in the fields, the fruit in the orchard, the cattle in the meadow, and the humble hut under the trees? Have you not often walked in and out the old cow's ear, and avoided the switch of her tail? Of course you have. Then speak, Mr Fly. Oh! you have no voice. What a pity, poor Fly; not for you, Mr Fly, but for the poor starving biped man, who rots in towns for want of work, while the broad earth waits his quickening hand, which, in wanton cruelty and idleness, pins you to the wall, in brute ignorance of your useful lesson.

EMIGRATION—1620-1871.

WHEN it was found that the accession of James I. did not tend to any mitigation of the pains and penalties to which Nonconformists were at that age subjected, many of that body, disdaining to temporize with the Government, sought in foreign lands the liberty denied to them at home. A large portion, after many wanderings, found a resting place at Leyden.

But their hearts yearned for the old customs and the familiar accents of their native land, and at last their pastor, the Rev. John Robinson, spoke of the Western Continent, where they could found a New England in the wilderness.

After much and anxious deliberation, a joint stock company was formed, and two vessels, the "Speedwell" and "Mayflower" taken up or chartered. These vessels were respectively 60 and 120 tons burden. Owing to incapacity on the part of the captain of the first-named vessel, the "Mayflower" sailed alone on the 6th September 1620, carrying forty-one male emigrants. An error in navigation on the part of the captain of the vessel, disembarked them at Cape Cod, Bay of Fundy, Massachussets, instead of in the northern part of Virginia, and it was not until the 11th December 1621, after many explorations and many disasters, the weary pilgrims took possession of the long promised land—then a frozen, inhospitable desert, which they named New Plymouth, in fond memory of the last place in dear old England, in which they had lived.

By the time the birds began to sing pleasantly in the woods, half of the emigrants were dead! No wonder, for the dangers and the privations they had passed through were of no ordinary severity; but still they were not great enough to break the spirit or kill the energies of Englishmen who had sought in New England that "freedom to worship God," denied to them at home.

I say nothing as to the proud position *this* little colony achieved. "Land of the West," sings Eliza Cook, "tho' passing brief the record of thine age, thou hast a *name*"—and this name is the result of that true heroism displayed by the Pilgrim Fathers.

On the 6th April 1871, the screw steamer "Scandinavian," 3000 tons burden, sailed from Liverpool, having, among other passengers, seventy-five souls in all, destined to found the first English colony in Nebraska. Imagination in vain seeks for language to depict the different circumstances of the two first colonists. The first crowded into a vessel of so small a size that it would be now deemed all but useless for a mere coasting voyage, landing in an unknown country, exposed to all the privations of houseless, homeless wanderers; disease and death in their midst, and nothing to sustain their courage but the stern feeling of duty, and reliance on the God whose service they preferred to all this world could give—but this was everytl

The *second* lot of the two colonists named, left Old England with none of the heartburnings experienced by the first, save that alone of leaving old friends and old associations—and how different their means of conveyance to the land of promise! A gallant, well-appointed steam-ship, with a tried and trusted navigator in command, set sail, or rather steamed away, and in a very short time, the Hayward colonists are landed, and doubtless have arrived at their ultimate destination. Through tickets, with coupons attached thereto, enabled the emigrants to choose their route after landing, and they would reach Nebraska unwearied by the journey, and able to enter at once on their new duties. No hostile tribes to dispute possession of their farms, not having to await fresh supplies from *home* ere the land has brought forth its increase. The contrast between the circumstances of the two colonies is, indeed, remarkable, and it may be well to pause for awhile to contemplate what may yet be the results arising from the superiority of the latter. The world knows what the pilgrims by the Mayflower have done, the influence their conduct has had on past, and will have on future generations of the English-speaking race, and it is in no spirit of exaggeration to say that the *opportunities* afforded them by the Scandinavian ought to and may bear fruit commensurate with the advantages they possess. Is it too much to expect that such advantages will be used aright, that their fellow-citizens may *take knowledge of them*, and point to their industry, sobriety, and *success?* Is it too much to imagine that this colony will draw towards it many families who will too gladly rejoin the friends gone before them, and that they may long continue to receive new accessions of men of English blood, speaking the dear old English tongue, who may join with all true Americans in keeping pure and intact the blessing of that freedom which had its birthplace here. Burke, speaking in the House of Commons, in 1775, of New England, asked, "What in the world was ever equal to it?" Let the State of Nebraska be an example to her sister States, and let this infant colony set an example to the other citizens in the State, and this youthful State shall shine with brilliance amidst the other stars of the Union, and her influence be felt therein.

I have said that this infant colony consisted of seventy-five souls. Among the males were farmers, their sons, mechanics, labourers, and men of business. On landing at Portland, they will proceed to the locality chosen, and in the midst a town will be built. The Burlington and Missouri River Railroad Company will connect this town (I beg pardon—it will be a city in less than no time), and very soon mills and manufactories will arise, giving employment to others than agriculturists. As I, a short time since, drew the attention of your readers to the advantages offered by the State of Nebraska, through their Commissioner, Mr W. H. Hayward, to emigrants, I think it but just to state that the efforts made to secure comfort to those who avail themselves of such, have been and are ably seconded by the *Burlington and Missouri River Railroad*, who seem determined, with true American energy, to do nothing by halves. This Company has positively established an office in London, and also in Liverpool, for the sale of tickets through from here to Nebraska. Well, is not that enough? No, nothing but *the entire animal* will satisfy the Burlingtonians. You can purchase from them tickets securing a passage all round the world.

One of their advertisements is a curiosity in its way, and the opening remarks anything but complimentary to at least one of Britannia's naval heroes.

"AROUND THE WORLD.

"In these modern days, *any one* may successfully *rival* Captain Cook, and without any great outlay of time, money, or trouble."

This is rather a cool statement, but they shew how the trip round the world can be made in seventy-seven days and ten hours, after travelling the little distance of 23,765 miles. I am not an alarmist, but really this Burlington and Missouri River Railroad Company must be looked after. It would seem that they not only purpose to abolish all the usual inconveniencies attendant on the journey of colonists or emigrants, but to make a journey round the world the most easy thing imaginable; and what then will become of the traditional halo of interest with which any one who had travelled was wont to be surrounded?

Any one rival Captain Cook! Why of course they can, if the facilities offered by the Burlington and Missouri River Railroad are used. Now, there are various reasons for the actions of men and companies. The chief end of both is the acquisition of wealth. Many seek to attain such end by means by no means to be commended, while others strive to achieve their purposes in such a way as to command the re-

spect and support of their fellow men. This company owns 1,500,000 acres of land! Just fancy the Directors having a quiet dinner after their meetings, and imagine the song of the evening to be, "When a little farm we keep." But the best of the joke is, they do not desire to keep the little farm, but wish to sell it, and here appears that practical foresight for which our American cousins are famous.

They offer their land on ten years' credit, the upset price being about the same as Government land; for the first two years no payment is asked for, save that of interest at 6 per cent. on the value, and then the payments are 1-9th every year, and interest on the balances. This is for prairie lands, which, after all, are the best for emigrants not blessed with a superfluity of capital; but for timber lands their terms are somewhat different—viz., for cash in two years, with 18 per cent. interest, at 20 per cent. less than on ten years' credit. I do not know the scale of prices, but presume they are according to locality. This is a capital plan, enabling the settler to husband his resources until the fruits of his husbandry appear, when it is but reasonable to suppose he can pay for his land long ere the expiry of the appointed time, receiving, doubtless, rebate of interest, and thus materially lessening the cost of his property. And it is a good plan for the Railroad Company—it makes settlements all along its line, and it is for the interests of the Company to make as many branch lines as may be from time to time required, thus adding to the comfort, to the wealth, and happiness of the public, while securing their own legitimate profit.

I gather the foregoing from a few papers sent by Mr Hayward, at my request, but I recommend every intending emigrant to do what is my own intention—viz., to call on that gentleman, and obtain information on every point connected with this really very important matter. I notice that he expects to send out another party to join those already sent out by the "Scandinavian," and if it should seem desirable, I may return to this subject, convinced as I am that the printed statements issued by Mr Hayward, on the part of the State of Nebraska, and those of the Burlington and Missouri River Railroad, bear the impress of a *bona fide*, not always met with in the emigration business, and thus that many may be directed aright in their aims.

DUN-EDIN.

MILK AS A COSMETIC.

THE use of cosmetics is common to all ages and to all climes. Jewish ladies, in the time of Solomon, and Christian ladies, in the reign of Victoria, have not been unmindful of adding to their charms by applying different ingredients to the skin, for the purpose of preserving its delicacy and beautifying its appearance. Madame Rachel was neither the first nor the last artist in skin decoration, although she certainly was one of the most expensive to deal with. From the painted wife of the Indian chief of the backwoods or desert, to the powdered and rouged dowager who drives along our parks, the gentle sex are skilled in the secret arts of making themselves "beautiful for ever." We hear little, however, in the present day of the use of milk as a beautifier of the skin. In the country, we have seen milk applied to the body in several ways. Pure cream, as cold as it can be obtained, is used to chapped lips and to scalds. "Skyblue," made lukewarm, is not uncommonly used as a fomentation, and rustic maids who have had their hands and face scorched by the sun in the harvest field, attempt to cool their skin and restore its colour by washing it with butter-milk. We have never known in this country any preference given for one milk over another for such purposes, if we except a supposed remedy for any soreness of the eye—viz., that of forcing milk from the human breast into it, a quack practice followed by the peasantry of some districts, and said by them to be of peculiar benefit. For medicinal and dietetic purposes, the difference between the milks of various domesticated animals has not been unknown us. We have seen children reared on goats' milk in preference to that of cows', over which it was supposed to contain more nutritious and digestible elements for the infant stomach. Mare's milk, fermented and made into Koumiss, has for a[illegible] been prized by the Tartars for its health-res

qualities, and it is now becoming widely known in England for its valuable properties since its introduction by Dr Jagielski. But ass's milk, we are told, was the great favourite with Roman ladies! The imperial wives of the voluptuous Cæsars revelled in it. A Roman lady in those times went to bed with a court plaster of bread and ass's milk applied to her face. The application of this novel cosmetic, or rather poultice, gave her, on awaking, a very cracked appearance, but when it was removed by further washing in ass's milk, her skin was considered to be sufficiently perfect as a groundwork for the red and white pigments with which the slaves decorated her face. Some fine ladies of that olden time took a bath of ass's milk as often as seventy times a-day; and whenever Poppea, Nero's favourite wife, travelled with her gay retinue, she took along with her herds of asses, so that she might take her usual bath whenever she pleased. It must have been a luxury which the wealthy only could enjoy to such perfection. Should the popular Roman custom revive among English ladies, we assure them also that their ablutions after the Roman fashion will not be inexpensive. We have just purchased of Mr Deverson, of Edgeware Road, a sample of ass's milk, which he retails at 5s. per quart. A sufficient quantity for a bath for a moderate-sized lady would considerably add to the daily expenses of the household. Of course, where there was a tendency to *embonpoint* amongst members of the family, it would be still greater, as the displacement of the fluid, milk, would bear the same proportion to the foreign body immersed, as happened with water when the Greek philosopher shouted the memorable word "Eureka!"—*The Milk Journal.*

Farm Architecture.

VENTILATION.

iving a few hints on the arrrangement ıd construction of this important rural construction, we shall take the a dairy as an example, in which the ıerfect system is desiderated, for the ıwal of used air, this being modified il more or less for other buildings, in a less complete system of ventilation ıed necessary. In the interior atmo-

"double" roof—we give in fig. 1 a design for this. A stratum of air when quiescent between two bodies, is known to form an excellent non-conductor, as is exemplified in the double window. In the roof shewn in the drawing, fig. 1 (half), air spaces, *b b*, are made between the common rafter, *c c*, and the principal rafter, *d d*, the under side of the principal rafter being lined with boarding, *e e*.

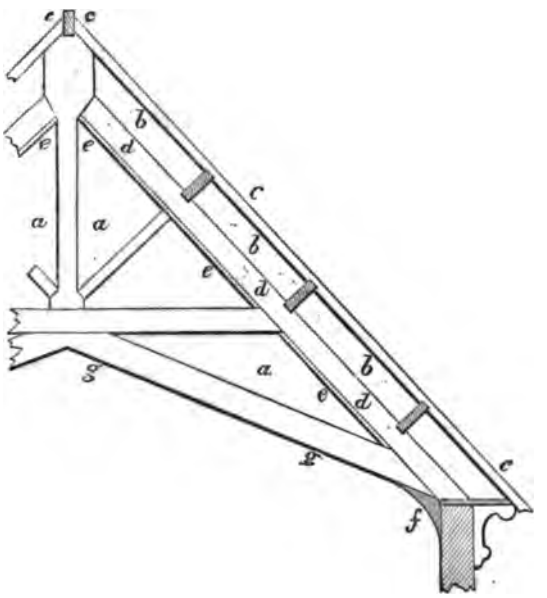


Fig. 1.

of a dairy, the great object to aim at is ıintenance of a temperature as uniform sible, all liability to sudden changes guarded against. Here arise peculi- in the construction of the walls and with the latter of which we have at ıt to deal. By far the best form of f for a dairy or apartment where a m temperature is desired, is the

Other air spaces, *a a*, are made between the principal rafter and the ceiling joists, which run along the under side of rafter, *g g*. The roof is designed so as to give a coved ceiling; the parts *f f* being rounded off so as to facilitate the passage of the air to the highest point of the ceiling at *g*, at point, at distances along the ceiling, the ventilators are

the air is withdrawn from the interior of the dairy. In fig. 2, we give a section of the same roof as in fig. 1, at a point between two of the principal rafters, and at which one of the ventilators is placed. The ventilating shaft is taken right through the space between ceiling and the roof exterior boarding, and is finished at top with a "cap," *d d* as shewn, and at the ceiling with a valve, *c c*, which is raised and lowered by means of a cord, *a a a*, passing over pulleys, *b b*, and led

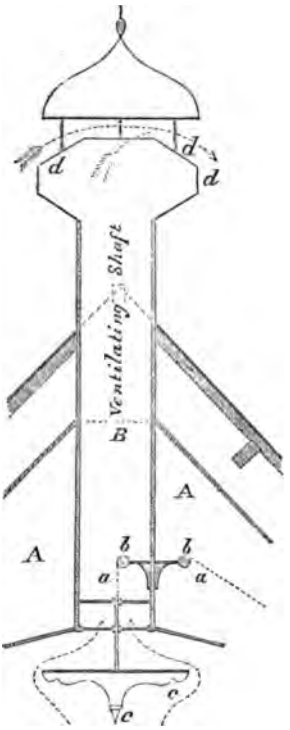


Fig. 2.

through a small aperture in the ceiling, to a convenient point in the interior of the dairy, where it is provided with a counterpoise weight and pin, which slide up and down in a grooved plate attached to the wall. The great objection to withdrawing the air from the interior of the building by a ventilating shaft placed at one point in the roof, or by more than one shaft, such as is illustrated in fig. 2, is that the air is withdrawn, or apt to be withdrawn at the point immediately beneath, or within a limited area around the ventilator opening. The most perfect ventilation would be where the air was withdrawn uniformly all over the surface of the ceiling. To effect this, we have proposed a form of ceiling in which plaster would be dispensed with, and a series of spars, *b b b*, fig. 3, nailed to the rafters

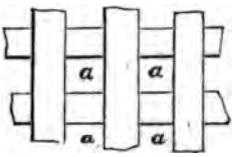


Fig. 3.

Fig. 4.

in such a way as to form a series of square or other formed openings, *a a a*, a section of this being shewn at fig. 4, shewing the mode of exit of the air. Or in place of the arrangement as in fig. 3, the spars might be placed in parallel rows as in fig. 5, a section of which is given in fig. 6.

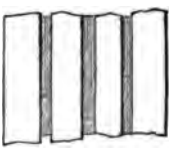


Fig. 5.

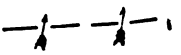


Fig. 6.

By any of the arrangements shewn, a *perforated ceiling*, so to say, would be formed, through the perforations of which the air would continually flow, and this *over all the surface of the ceiling*, so as to withdraw the air immediately from all parts of the apartment beneath. Such ascending streams of air would take the most direct course—viz., the vertical; as above would be apertures by which it could escape, there would then be no necessity for the air to go out of its natural course, as must be the case when the withdrawing ventilators are placed at certain points only of the ceiling. The air passing from the interior of the room by these apertures would spread out into the spaces A A, fig. 2, from which it would be necessary to withdraw it. This withdrawal could be easily secured by having ventilators, as in fig. 2, placed at the necessary intervals in the roof, but in this case they would only have to come down as far as the line B, in fig. 2.

arious forms of the "caps," or termina- s of ventilators, have been proposed, their e we might truly say is legion. The form vn in fig. 2, at *d d*, was that introduced by well known engineer, Tredgold, and ıave found it to succeed very well where- : we have adopted it. The principal ure in it is the adoption of the angular :s, *d d*, over which the wind passes, and in ı a way as to facilitate the withdrawal of air contained in the shaft. In fig. 7 we

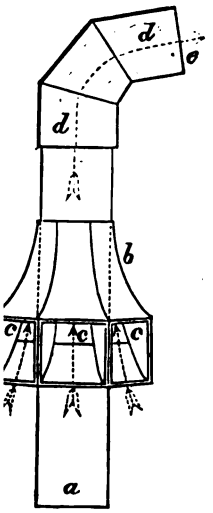


Fig. 7.

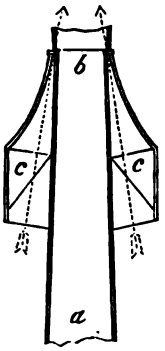


Fig. 8.

w another form of ventilating cap which ; exhibited at the Paris Exhibition of 7, and is the invention of M. Nouhalier, which has been largely used in France. this, *a* is the ventilating shaft fixed in the f, and communicating with the space from ch the air is to be withdrawn; this pipe is ended up as far as the point *b* in fig. 8. ed in this pipe, and embracing it, is ther pipe, *b b*, shaped at its lower extre- y so as to present a series of curved nings, *c c c*, up these, as indicated by the ows, the currents of air are forced by the d, and passing the mouth of the pipe, *a b*, d to withdraw the air in its interior, and s it out at the aperture, *e*, of the revolving or coul, *d d*. In fig. 9 we give a drawing nother form of ventilator, made, we be- e, by Mr Nathan, Hill Street, Rich- mond. In this, *a* is the shaft fixed to the roof, *b b*, a revolving cap or cowl, provided with a blow-pipe *d*, at the mouth-piece *c*; the

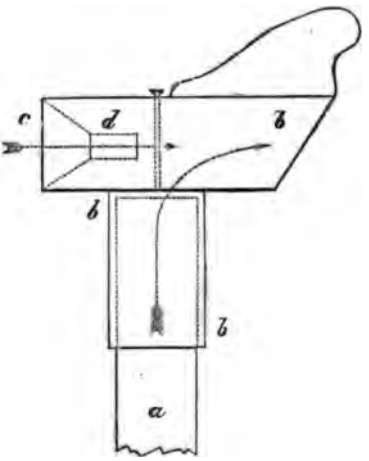


Fig. 9.

wind blowing through this tends to withdraw the air from the shaft *a*.

Ventilation, to be perfect in any building, involves arrangements for the supply of pure air, as well as those for the withdrawal of used or foul air. These must, in fact, work together, or no good results can flow from them. The foul air cannot be withdrawn from the interior of a building, unless fresh air be supplied to it, and, conversely, fresh air cannot be regularly supplied unless the foul air be regularly withdrawn. Ignorance or neglect

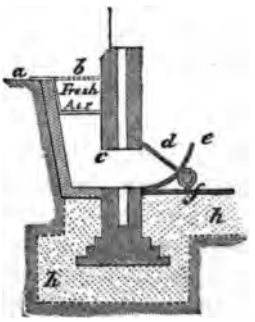


Fig. 10.

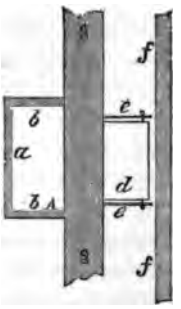


Fig. 11.

of these points is a fertile source of disappointment in the ventilation of buildings. There are numerous methods of introducing fresh air to the interior of buildings. Th

most commonly used are in connexion with the windows, these being so made as to open at certain angles, to throw the air up to the ceiling, or to right or left, as desired; or they are provided with perforated glass panes, or revolving ventilators placed therein; these last are very inefficient, and are rapidly going out of use. Very good supplies of air may be obtained by arranging the leaves of the windows to act as above named. Another method is simply to have gratings placed in apertures in the outer walls, near the floor level, and in other cases these are placed—as in the case of stables, or outhouses—in the wall above the heads of the animals, and in the centre of each stall. Air drains are also sometimes used, running along the passages, having grated apertures at intervals, through which the air is admitted. In fig. 10 we give a section of a mode of admitting air to the interior of a dairy, *a* being the ground level, *b* the air channel with box or grating, to prevent the entrance of vermin. In front of the opening *c*, in the interior, a valve of wrought iron, *d*, is placed, the walls of this are furnished with pins which slide in grooves made in quadrants, *e e*, fixed into the wall; and which pins are provided with thumb pinching screws, so that the valve can be fixed at any angle desired. Fig. 11 is the plan, and fig. 12 a front view of same. These drawings refer to the section of dairy given in our last number, page 335, *b b* in figs. 10, 11, 12, corresponding to the steam or hot-water pipes, *c c*, at the sides under the milk shelves *M M*. In fig. 1, page 326, *d d*, in the centre, are milk troughs, also provided with heating pipes. These are of course only used in winter.

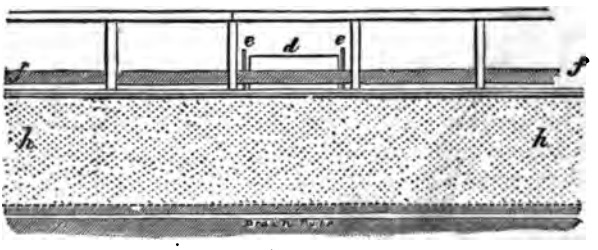


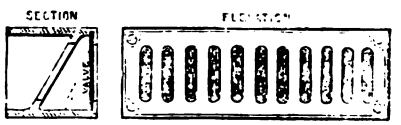
Fig. 12.

Agricultural Engineering.

IMPROVED VALVE FOR VENTILATING STABLES AND OTHER BUILDINGS.

WE have had an opportunity of examining an improved ventilating valve ɔr stables, cow-houses, &c., and other buildɪgs where animals are confined. The aparatus is designed by Mr G. Armatage, ɔrmerly connected with the teaching of eterinary science in the colleges at London nd Glasgow, and is manufactured by Mr homas Fardon, engineer, Leighton-Buzurd, Beds.

The great object in ventilation is to secure proper regulation of currents of air through building. Holes may be made anywhere, ɪt to ensure the passage outwards of heated ɪd impure air, is another matter. The ɔmmon plan of inserting grates or air icks in stables over the horse'shead, is a ɪnstant source of annoyance. Such a ɔsition is condemned for the common ɔparatus, and while it is not preferred for e improved valve, the evils are greatly ɔutralized. The sides or ends away from e animal's head are selected as near the nd quarters as possible, and in the proxiity of gas lights. When animals are tied ɔ to the middle of buildings, or allowed to n loose, no particular choice of locality is ɔeded, as long as a free outlet occurs at e outside, and a gaslight, when in use, ɪrns beneath on the inside.



The valve is composed of cast iron, ɪe proper size being that of an ordinary ick. In front, a movable plate is fixed ɣ a screw at each corner (see elevation), and perforated by a number of elongated apertures. Behind this plate, an oblique diaphragm is fixed (see section), being cast with the outer frame. This is perforated like the front plate, in order to admit of the free passage of air. Behind the front plate sufficient space is left to inclose between it and the upper portion of the diaphragm, a sheet of thin india rubber (see section), which forms a *hanging* valve, and constitutes a sensitive means of preventing sudden gusts of air in an opposite direction. The diaphragm is arranged, in the form described, to prevent the valve from passing too far outwards and becoming fixed. When in position, the front plate is placed on a level with the inner surface of the building, and the situation and movement of the india rubber valve perfectly insures the stoppage of cold currents of air inwards, while the gentle pressure of warm air from within, pushes it backwards and passes outwards.

In stormy weather, the use of the valve is most apparent. The wind blowing in one direction closes the valves on that side of the building effectually, while those on the opposite side—unacted upon from without — are left free to the action of warm air within. By these means, we understand, many places have been successfully ventilated, and in those where their application was impossible, the same principle, under modification of form, has succeeded admirably. When our enthusiastic admirers of pure air in buildings are informed that the manufacturer is enabled to supply the valve at the low cost of half-a-crown, we do not think many will allow their stables and cow-houses to remain long without such an apparently useful agent in maintaining the health of animals.

The Farm.

IMPORTS AND EXPORTS OF AGRICULTURAL COMMODITIES.

THERE is nothing more interesting, nothing more conclusive, than figures. To use Burn's expression—

> Facts are chiels that winna ding,
> An' daurna be disputed,

—that is, when they are rightly interpreted. This, we believe, to have been the poet's meaning, but others, who are not by any means poets, have twisted figures into such a shape, as to take all meaning, or what is worse, all truth out of them. But such figures as we give from the Trade and Navigation Accounts have no twist whatever in them. They are simply the record of the transactions of this country with other nations, expressed in the most precise way possible—a little too concise, perhaps, in some cases; as, for instance, in regard to animals. We are told how many come from abroad, but we are not informed from whence they came. No doubt, space is saved by the absence of particularization, and in this economical age, when every shilling is made "a prisoner," and when the national funds are low, it is proper that this should be the case. But wherein lies the consistency of telling us from what particular country we get our corn, and of withholding the names of the nations that supply us with beef. Bread is not the only commodity that we subsist upon. "The roast beef of Old England" is as much appreciated as bread, and the eulogistic song wider known than any in favour of the big wheaten loaf which the late Sir Robert Peel had the generosity and the manliness—it was manliness in the best sense of the word at that time—to bestow upon his fellow-countrymen. It would be interesting to know where the foreign beasts and sheep are imported from; and the expense of adding a few lines to the returns would not be great.

In the month of April this year, we notice a considerable increase in the number of oxen and bulls imported over that shewn in the April tables of last year—viz., 10,717 as against 8767—and the value had risen to £179,434 from £149,408. The relative price, it will be seen, was much about the same this April as last—in round numbers, £17 per head. We imported last month nearly three times as many cows—viz., 2060 as against 765. Of sheep and lambs we had nearly 13,000 more than in the month of April 1870, the exact numbers being 82,532 to compare with 69,708. The cost this year was £142,909, and last, £110,375, shewing an approximate difference, roundly speaking, of about 3s. per head, the price each this year being 34s. 8d., and last year, 31s. 8d. Of calves we had a much shorter supply last April than in the corresponding month of the previous year, only 1547, to compare with 2642. For the past month, the sum we disbursed to foreigners for calves was only £5476; in the fourth month of last year, it amounted to £10,305. The price of each animal this April was £3, 10s. 9d.; in the like month of last year, £3, 14s. 1d. The pig trade was much more extensive in the month of April 1871 than in 1870. Of porkers we received 6400, as against 4742 and paid for them £23,537, to compare with £17,726, a price less by 1s. 3d. per head than we purchased them for last year—viz., £3, 13s. 6d., as against £1, 14s. 9d.

There is a very large increase in the imports of bacon, the weight imported in April of 1870 being 64,370 cwt.; last month, 107,305 cwt., the respective values being £198,469 and £270,293, so that this year we had it

rably cheaper—for £2, 10s. 6d. per
stead of about £3, 2s. in the corre-
ıg month of last year.
e was also a large increase in the im-
ıf salted and fresh beef, the quantity
former received being 59,147 cwt.,
the latter, 2325 cwt., to compare with
cwt., and 1565 cwt. in April last
t costs respectively of £135,123 and
122. Of butter, we had a slightly
supply, 100,402 cwt. to set against
5 cwt., the prices paid having been,
pril, £533,632, the one before,
)77. Foreign cheese was much
in the market, of the April of this
than it was in the corresponding
of 1870. The precise quantities
his April, 46,579 cwt., last, 45,013
and the values £121,400, and
503, and the price this April,
s. 1d. per cwt., last, £3, 9s. 1d.
mported of wheat last month about
) qrs. more than we did in the
onding month of 1870, and in the
ur months of the present year, up-
of 560,000 qrs. The increase is
ally made up, indeed we may say
by Russia, from which country we
:d last month, 925,739 cwt., as
424,126 in the April of 1870. The
ıantity for last month was 2,282,936
for the corresponding month of
ear, 1,853,755—the values being,
8,634, and £902,771. From these
it appears that this year we were
in April, for our wheat 12s. 8d.
t., while in the corresponding month
year we received the same weight for

quantity of wheat reaching our shores
course of the four months that are
amounted to 9,893,386 cwt., and the
£5,814,486. In the same period of
ear, we paid only £4,377,112 for
370 cwt. The price on the four
s per cwt. is pretty nearly the same as
one month, being for the first four
s of 1870, 9s. 4d.; and for this year,
l

following tables shew the exact quantities of our imported grain in April, and the countries whence we derived our supplies of wheat, as well as of other cereals. Upon the latter, a general decline will be noticed. The values we also give after the quantities :—

QUANTITIES.

Wheat.	Month ended April 30, 1870. Cwt.	Month ended April 30, 1871. Cwt.
Russia	424,126	925,739
Denmark	40,730	99
Germany	372,442	371,486
France	2,200	160
Austrian Territories	8,700	23,449
Turkey, Wallachia, and Moldavia	21,869	91,413
Egypt	6,800	—
United States	934,278	806,278
Chili	35,776	47,390
British North America	528	1,893
Other Countries	6,306	15,029
Total	1,853,755	2,282,936

VALUE.

Russia	£185,555	£538,745
Denmark	18,329	64
Germany	194,376	246,667
France	1,073	107
Austrian Territories	4,024	14,184
Turkey, Wallachia, and Moldavia	8,914	52,995
Egypt	2,975	—
United States	465,360	520,419
Chili	19,081	33,256
British North America	246	1,344
Other Countries	2,838	10,853
Total	£902,771	£1,418,634

QUANTITIES.

	Month ended April 30, 1870. Cwt.	Month ended April 30, 1871. Cwt.
Barley	865,809	648,073
Oats	692,516	584,512
Peas	97,069	68,955
Beans	123,971	172,008
Indian corn	852,468	816,274

VALUE.

Barley	£344,641	£270,794
Oats	242,380	234,966
Peas	37,283	32,278
Beans	49,871	78,648
Indian corn	284,156	334,414

QUANTITIES.

	Month ended April 30, 1870.	Month ended April 30, 1871.
Wheat Meal and Flour.	Cwt.	Cwt.
Germany	92,028	103,139
France	122,315	6
United States	159,818	222,055
British North America	—	2,386
Other Countries	55,639	57,922
Total	429,800	385,508

VALUE.

Germany	£59,051	£91,380
France	84,601	6
United States	98,901	189,644
British North America	—	1,444
Other Countries	35,689	61,256
Total	£278,242	£343,730

Eggs are still decreasing, the "great hundreds" having dwindled down from 494,099 in April 1870, to 471,715 in the like period of this year. But, notwithstanding the smaller numbers, we had to pay more for them, the sum disbursed last month being £172,014, as against £131,760. We had a larger supply of hams, but they were not quite so expensive as last year. Of preserved meat, we had also a considerably larger quantity, and of salted pork also. Potatoes have fallen off greatly, from 57,064 cwt. to 27,427 cwt.

Turning to manurial substances, we note that bones are still being run upon, the quantity imported last month being 9910 tons, as against 6569 tons in the like period of last year, the cost being, in the April just past, £63,742, in the previous one, £41,603. We had a large increase in the imports of guano—this substance is not now specified in the returns as it was wont to be, so that it cannot be told whether it is Peruvian or not—the quantity received last month being 33,406 tons, to compare with 17,611 tons, and the price, £375,514, as against £178,789. Nitrate of soda was also more in demand.

There was a great falling off in the receipts of oil-seed cakes in the month, the quantity received being only 8335 tons, whereas, in the April of 1870, it was 13,118 tons; but despite the smaller quantity we imported, we had to pay much more for it than we did in the April of last year—viz., £128,527, as against £114,805, or about £15, 8s. 6d., instead of £8, 15s. We had a slightly smaller supply of cotton-seed, and an appreciable increase upon rape-seed.

There is a very great increase in the imports of wool on the month, as the following table shews. We give the value as well as the quantity:—

QUANTITIES.

	Month ended April 30, 1870.	Month ended April 30, 1871.
Wool, Sheep, and Lambs.	lb.	lb.
From Countries in Europe...	757,858	1,975,038
,, British Possessions in South Africa.....	1,776,890	3,085,107
,, British India.....	594,744	2,367,120
,, Australia.....	22,677,940	40,601,253
,, Other Countries	1,525,208	3,030,152
Total	27,332,640	51,058,670

VALUE.

From Countries in Europe...	£39,171	£93,713
,, British Possessions in South Africa.....	118,459	156,396
,, British India	18,896	79,179
,, Australia.....	1,488,382	2,385,828
,, Other Countries.....	48,672	95,666
Total.....	£1,713,580	£2,810,782

Turning to the exports, so far as they relate to agricultural matters, we find that there is a slight increase in the quantity of butter sent abroad in April, and a considerable decrease in cheese. Horses were not exported so numerously, only 210 having been sent, as against 227 in the April of the previous year, and their quality was much inferior, as will be seen from the sums realized for them—viz., £9834 last month, and £13,573 in the like month of 1870. Last month we exported wool to the extent of 846,439 lb., the value of which reached £61,402, to compare with exports in the like time last year, 560,243 lb., and value, £37,837.

THE DISADVANTAGES OF COOKED FOOD FOR ANIMALS.

THERE are two sides to every question; and although it may happen that arguments as given on paper, appear very plausible, yet in the face of everyday experience the reverse often is proved to be fact. We have no desire to be cynical in the course of the following remarks, but offer the results of daily observation—personal and otherwise—in the hope that a subject of vital importance to stock-owners and feeders may gather strength, and efforts culminate in the general advancement towards success in one of the most valuable departments of our social economy—the management of our domestic animals.

In the science of animal physiology there are many profound conditions to be taken into consideration, and those who have undergone but a partial tuition in it are apt to confound effects with causes. The distinction between these is all-important, and hence our reason for referring to the subject.

A paper on the "Advantages of Cooked Food for Animals," read before the American Agricultural Institute lately, is no exception to the statement we have made. The writer, Mr J. D. Curtis, has the happy knack of making up a readable paper. It is the subject of animal physiology which appears to us to be at variance with facts, not the general tendency of the lecture.

"Constipation is the great curse of animals, and the cause of nearly all the diseases which afflict them." As an argument upon which to found data for the *cause* of disease and necessity of cooking the food of animals, this is probably the weakest. Constipation, as will be found by a reference to every authentic work on medical and veterinary literature, is to be regarded as a *sign* or the *effect*, not the cause, of disease. After constipation has fully set in, the lives of men and animals are frequently doomed, in a stage at which the action of cooked food would be of little good. Whatever results are made known as disorder by the state of the digestive organs, it must be borne in mind that previous conditions of mal-action must have existed before those signs could be produced.

"A perpetual summer of green food, prepared by 'Dame Nature,' would obviate all this, but a prolonged diet upon the dried juices and woody fibre of hay and straw, and the hard, unyielding cereal, exhausts the gastric juice, breaks down the delicate organism of digestion, irritates the membranes, and inflames the intestines, hence the emaciation or disease, and the stock come out poor in the spring." We argue differently. If "Dame Nature" had considered it wise that animals as well as man should enjoy a perpetual summer, she would have ensured the institution, and Mr Curtis should remember that the nature of green food is such as, affording but little nourishment, animals are induced to take the necessary amount of exercise in the search of it which becomes almost constant. An animal at grass is said to be continually feeding; but when the cold of winter comes his supply in the fields is cut off, and food is given to him in bulk in a covered building or yard. No roaming is necessary then, and when injudicious or parsimonious owners act on the principle of causing a summer's grass to make up for a winter's starvation, we may expect that conditions the reverse of health will be established. Dame Nature, however, has so ordered matters that when summer green crop is exhausted, the various tubers have ripened and are available for use. These, with a judicious mixture of the cereals, good shelter, water, &c., are all that are required, and the statement may be accepted as a rule for stock-feeders to adopt. If the principle were more generally accepted, stock management would be a greater certainty than it is, but too frequently the disorders of digestion are produced

most indigestible food, want of shelter and proper exercise, which in winter time operate strangely and powerfully.

Mr Curtis says :—"It is not the quantity of food taken into the stomach, but the amount absorbed by it, which benefits the system." We think a slight alteration in the construction of this sentence would approach nearer to fact; it is the amount digested that confers the benefit, not that which is absorbed, as everyday truths abundantly shew. Farmers in every part of the world have had cause to lament the loss of their prime heifers from anthrax, known as black leg, black quarter, speed, &c., the older stock from splenic apoplexy, sheep from braxy and horses from albuminous nephrites, particularly where cooked food has been given, and these states of fatal disease arise from the amount absorbed, which constitute a blood poison. In no place do we find these conditions so common as where cooked food is given, and collateral states of neglect and mismanagement occur, yet we find such erroneous principles recommended, while science is thoroughly ignored.

Thorough mastication of food is recommended as all-important, but the author has omitted to observe that cooked food rarely calls forth the necessary process, and no amount of cooking will render the food more nutritious. Mastication is essential for two purposes—to break down and saturate the food with an important fluid—the saliva, that fluid effecting important changes in the nutritive elements to fit them to undergo subsequent actions by other juices of the digestive organs. It is not possible to supplant these secretions by any process of preparation by cooking or addition of fluids. Dame Nature has supplied vegetable food for every season, and only requires of man that he should observe the peculiarities of each, and give the benefits to animals as far possible. It is a decided mistake to cook the food of animals when it is sound and sweet. The mistake, so called, of supplying the dry food in winter is more apparent than real. The exercise of common sense is called for in order to regulate the practice with suitable roots, and proper shelter and warmth, more than is usually done. It is a mistake to neglect the young stock so much as is commonly done. If more attention were paid to them, and the supplying of artificial and natural food increased during the period of their most active growth, adverse states would not be so general, and the remedy less sought after in useless preparations of food.

Among working horses, the effects of cooked food are something marvellous. Cholic, and indigestion generally, with disease of the liver and kidneys, is of common and fatal occurrence. It may be more easily understood to say such preparations are quite unnatural, as the digestive organs are constituted to act upon the most nutritive grains. It is also commonly believed that animals, especially horses, pass much away by the bowels that ought to be digested and appropriated to the system. This question requires more philosophical research before it can be definitely and accurately settled, but we can go so far as to say, that when the masticatory organs are in good order, and digestion perfect, a proper allowance of food is thoroughly assimilated. *Apparently whole* grains may be found in the excrement, but upon close examination they will turn out to be the *shells only*, which by the action of the digestive juices, have been divested of their internal nutrient parts. Some persons look upon digestion as a process in which everything must be utilized for the building up of tissue. They forget it is quite as essential that other substances should be present—these non-nutritious in themselves, but by their constitution and presence give bulk to the rest, and assist in their general reduction in the stomach of the higher animals, exactly as the sand and pebble act in the crops of birds.

The success of feeding our domestic animals does not lie in the way of cooking food and administration of condiments, but in a judicious management generally, in which the peculiar features of organization, physiology, geology, meteorology, and hygrometrics, play their respective parts, and agricultural success will never be certain until these branches of science are more definitely acknowledged.

CULTIVATION OF LAND BY STEAM POWER.

By Mr G. SMURTHWAITE.*

THE leading features to be considered are—firstly, the cost of a good set of tackle; scondly, the lay-out of a farm suitable to this tackle; and thirdly, whether it will pay or not. To begin with cost: the price of Fowler's single engine set of 14-horse power is £1000; the double engine set of 14-horse power £1780. The price of Howard's single engine set of 14-horse power, round-about system, is £850; the double engine set of 14-horse power £1350, and these two makers are considered the best. Unless with a man of large capital, or a company, the price of a set of tackle could not be raised, so we must suppose that a man has the capital and a large enough farm (say 500 acres of arable land) to make it worth his while to buy one. The next point to consider is whether the shape and size of his fields are suitable for steam-cultivating, or whether they could be made so without incurring an enormous expense; then we should be sure that the nature of the soil on his farm is adapted for it; for I am certain that land of a gravelly nature, or near the rock, is not the kind of land to work by steam, as very little work is completed when going slow, or a great number of breakages occur when going fast, thereby annoying both the mind and pocket of the employer; but supposing that his farm is either a strong clay or a light loamy soil, he will then do well to purchase a set suitable to his occupation. By this I mean, if his land is very hilly, one of Howard's or Smith's roundabout tackle, or if tolerably level and well roaded, one of Fowler's tackle, direct system, would be best. We now come to the third part of our subject, and the one which is, or ought to be, the grand consideration, and that is, does it pay? I dare say there are some here who will say, of course it does; others again will say, it does not; and I could give you accounts of many different sets of tackle, some which pay, and some which do not. I will, however, be content with giving you the working expenses of one or two, and their opinions on the advantages of steam. As far as my experience goes, I have no doubt that upon strong land the produce is much better developed, and land improves yearly, and is much more easily worked after every operation; it also can be cultivated to a greater depth than by horse-power, though this should be done by degrees, as I have seen a crop ruined after the ground has been dug up too great a depth at one operation. I think that steam is of more use on clay than a light land; for instance, the cultivator can work the land thoroughly without any treading, as is the case with horse cultivation. I have had a letter from a gentleman in Yorkshire using Howard's roundabout system, and he says that he can cultivate even small fields, 10 inches deep, at a cost of 10s. per acre; of course, large fields and lighter work can be done as low as 5s. per acre. He likes a portable engine better than a traction, as his farm lies well together, and therefore he can cultivate for several days without having to move his engine. It is a great saving in original cost, and also cost of repairs, as the traction costs £50 per annum more than the portable. He says the great cause of this extra expense is travelling on hard roads and up and down hills while the boiler is hot, and the metal consequently more tender. We have used a 14-horse Fowler's traction engine in the Forcett Company for seven years, and like it better than the portable; indeed, we could not move it from farm to farm with horses. It is an excellent plan in autumn, after the steam digger, to row up strong land intended for turnips, when clean, with four horses, so that the frost thoroughly pulverises it, and leaves it in a finer state

* Paper read before the Staindrop Farmers' Club.

sowing than any amount of working in spring can. The quantity ploughed and cultivated, of course, varies with the depth and looseness of the soil, but I generally have averaged, after a fortnight's steam cultivating on different kinds of land, ploughed and cultivated at different depths, varying from 6 to 12 inches, that we plough 5 acres a-day, at a cost of 11s. 1d. per acre, and cultivate 10 acres daily, at a cost of 5s. 7½d. per acre, so that the cost per day is 55s. 6d.; and using the tackle 130 days in each year, our yearly expenditure is £361, 5s. 2d. This is the average cost yearly of the whole company, and there is land upon two out of the four farms not adapted for steam cultivation, some at Holme House being of too gravelly a nature; some at Aldborough being too near the rock. The engine has sometimes been used for thrashing, and if the farmer had a set of tackle to himself it should thrash all his corn. Some of you perhaps think that £361, 5s. 2d. is a large sum per annum, but you should consider that ten horses fewer are kept by the company, and the remaining horses have none of the heavy work to do, as the engine is made the slave. I don't say that the land costs less to work, but I think that it is done more seasonably, and therefore stands a better chance of growing a good crop. When going over Mr Randall's farm at Chadbury Evesham, I saw one of Smith's tackle at work, which smashes land up at a cost of 10s. 10d. per acre, and crops it with one of Howard's cultivator at a cost of 6s. 7d. per acre. He also uses Fowler's three-furrow plough for deep work at a cost of 14s. 7d. per acre, thus having parts from the three leading manufacturers and making all work well. I cannot see the necessity of a double engine set, except on a very large farm (say 2000 acres), or to let out for hire, as the cost is nearly double in the first instance, and also in keeping up, let the makers argue as they may; besides, in this part of the world two engine men never could agree, and we all know the difficulty of getting work done pleasantly where they do not. I don't see how steam ploughing for hire can pay either party, unless a given number of farmers living not too far apart have such a quantity of land cultivated yearly that they may each do with two or four horses less than before they used steam. They can then afford to pay such a price per acre as will make it renumerative to the company. The prices charged by the Northumberland Steam Cultivating Association are:—For ploughing from 5 to 12 inches deep, the price varies from 10s. 6d. to 15s. per acre. For cultivating first time over, 8s. 6d. per acre; second time over, 5s. 6d. per acre. For harrowing first time over, 2s. 9d. per acre; second time, 1s. 3d. per acre. And these charges seem very reasonable; unless a set of tackle can be employed by a number of farmers, who promise to take out all earth-fast stones, roots, and other obstructions, then the prices might be lowered.

PREPARING STRAW-CHAFF FOR FEEDING PURPOSES.

By Dr Voelcker.*

In the current number of the *Journal* of the Royal Agricultural Society of England, Dr Voelcker has an article upon an excellent method of preparing straw-chaff adopted by Mr Jonas, of Chrishall Grange, Saffron Walden. Dr Voelcker says, the peculiarity of the plan of Mr Jonas consists in the use of a small quantity of green rye, or green tares, as a fermenting agent.

Mr Jonas, who for many years has been a great advocate for the consumption of a large portion of straw-chaff for feeding purposes, uses a 12-horse-power engine for thrashing, dressing, and bagging the corn ready for

market, and cutting the straw into chaff at the same time. With 1 ton of straw-chaff he uses about 1 cwt. of rye or tares, cut green into chaff, and 1 bushel of common salt. This is done in spring and summer; the chaff is not used until October or the winter months. The addition of the green stuff causes the straw-chaff mixture to heat; the volatile and odoriferous principles produced by the fermentation are retained by the straw-chaff, itself undergoing a kind of slow cooking process, and they impregnate the whole mass with an extremely pleasant flavour, scarcely inferior to that which characterizes well-made meadow hay. It appeared to me interesting, if not useful, to compare the nutritive properties of straw-chaff prepared according to Mr Jonas' plan, with ordinary wheat-straw, and I therefore made a careful analysis of a sample of chaff taken from the bulk at Chrishall Grange, supplied to me by Mr Jonas.

ANALYSIS OF THE STRAW-CHAFF.

The following results were obtained in the analysis of this straw-chaff:—

Moisture	7.76
Oil and fatty matter	1.60
*Albuminous compounds (flesh forming matters)	4.19
Sugar, gum, and other organic compounds soluble in water	10.16
Digestible fibre	35.74
Woody fibre (cellulose)	34.54
Insoluble mineral matter (chiefly silica)	3.20
Saline mineral matters (chiefly common salt)	2.81
	100.00
*Containing nitrogen	.67

The term woody fibre (cellulose) in the preceding analysis applies to that portion of the straw-chaff which remains behind after successively boiling the material with water, dilute sulphuric acid, and dilute caustic potash solution, and exhausting the residual dried substance with alcohol and ether. There can be no doubt that the different alkaline and acid secretions in the animal organism exercise similar, probably even more energetic effects upon straw than these successive exhaustions with various chemical agents in the laboratory. The treatment with dilute acid and alkali, therefore, affords a better insight into the digestibility of the bulk of straw than the mere exhaustion with water. Let us now compare the preceding analytical results with the composition of ordinary wheat-chaff. The following is the composition of a sample of well-harvested wheat-straw, which was neither under nor over-ripe:—

Moisture	13.33
Oil and fatty matter	1.74
*Albuminous compounds (flesh-form-matters)	2.93
Sugar, gum, and other organic compounds (soluble in water)	4.26
Digestible fibre	19.40
Woody fibre (cellulose)	54.13
Insoluble mineral matter (chiefly silica)	3.08
Saline soluble mineral substances	1.13
	100.00
*Containing nitrogen	.47

WHEAT-STRAW AND STRAW-CHAFF COMPARED TO THE ADVANTAGE OF THE LATTER.

A comparison of the composition of ordinary good wheat-straw with that of straw-chaff prepared by the system pursued by Mr Jonas, brings out several points of interest, on which a few observations deserve to be made. 1. In the first place, it may be remarked, that both kinds of straw-chaff contain about the same proportion of oil. The oil exhausted from straw by means of ether has a bright yellow colour, is sweet to the taste, and renders straw more palatable and more nutritious than it would be without this constituent. It is appreciable in quantity; for, according to the preceding data, 1 ton of straw-chaff contains about 39 lb. of oil. 2. It will be seen that fermented straw-chaff contains rather more than 4 per cent. of albuminous or flesh-forming compounds; whereas ordinary wheat-straw contains, in round numbers, only 3 per cent. The prepared wheat-chaff, therefore, is one-fourth richer in materials which produce the substance of the lean fibre of meat, or the muscle. 3. Common wheat-straw, of good quality, contains about 4½ per cent. of sugar, gum

and similar soluble organic compounds. In over-ripe straw the amount of these soluble matters is less. On the other hand, in the sample of fermented straw-chaff analyzed by me, the per-centage of sugar, gum, &c., amounted to 10.16, or to nearly two and half times the amount which occurs in good unprepared wheat-straw. The much larger proportion of sugar and other soluble matters in the fermented straw, no doubt, is due to the green-stuff employed in its preparation; but, at the same time, the process of heating the mixture, it is quite probable may have had the effect of rendering the chaff more soluble in water. Bearing in mind that the chaff prepared by Mr Jonas contains so large a proportion of succulent matter, it is no wonder that cattle and sheep are fond of it, and thrive upon it in a much higher degree than upon ordinary wheat-straw. 4. A comparison of the relative proportions of digestible and of woody fibre in fermented wheat-chaff, with their proportions in common wheat-straw, exhibits striking differences, which cannot fail to arrest the attention of stock-feeders. Taking together digestible and woody fibre, we have in the fermented straw-chaff 70.38 per cent., and in ordinary wheat-straw 73.53 per cent., shewing a slight difference in favour of the fermented chaff, which, being richer in sugar and other matters soluble in water, contains about 3 per cent. less vegetable fibre than common wheat-straw. When the vegetable fibre of each kind of straw-chaff, or the material insoluble in cold and boiling water, is treated with dilute acid and alkalies of the same strength, for the same length of time, and in all other respects precisely alike, a certain proportion of the vegetable fibre is rendered soluble. This soluble portion figures in the preceding analysis as digestible fibre, whilst the matters insoluble after treatment with the various chemical agents is termed indigestible or woody fibre (cellulose). Although it is not meant to convey by those terms the idea that animals have the power of resolving crude vegetable fibre into digestible and into woody fibre, in precisely the same ratio in which we can separate them in the laboratory, a tolerably good opinion may be formed of the relative digestibility of various foods, consisting principally of vegetable fibre, by submittting them to the process usually employed in laboratories for the determination of woody fibre. In the cases before us, it will be seen that of the total amount of vegetable fibre present in the fermented wheat-chaff, 45¾ per cent. were rendered soluble by the treatment described, and 34½ per cent. (in round numbers) left behind as indigestible woody fibre, whilst the 73½ per cent. of vegetable fibre present in common wheat-straw chaff were resolved, by treatment with dilute acid and alkaline liquid, into 19½ per cent. only of digestible, and into 54 per cent. of indigestible woody fibre. In other words, the same treatment rendered soluble 50.85 per cent. of the vegetable fibre of the fermented prepared chaff, and only 26.38 per cent. of the fibre of common wheat-straw. These differences are very marked, and well calculated to explain, in a great measure, the great superiority of the fermented chaff as a feeding material over common straw-chaff.

FERMENTATION: THE CAUSE.

The fermentation to which the straw is submitted in Mr Jonas' plan, thus has the effect of rendering the hard and dry substance, which constitutes the bulk of straw, more soluble and digestible than it is in its natural condition. But useful as the effect of the slow and moist heat, developed in the mixture of straw-chaff with green rye or cut tares, no doubt is in rendering the fibre of the chaff more digestible, this is not the only recommendation of Mr Jonas' admirable plan of preparing a really very nutritive and important food for stock. Another recommendation is the extremely delicate flavour and the palatable condition which is conferred upon the straw, in the process of fermentation. The prepared straw-chaff, kindly sent to me by Mr Jonas, had all the agreeable smell which characterizes good green meadow-hay, and a hot infusion with water produced a liquid which could hardly be distinguished from hay-tea. Although ferment-

ff resembles hay so much in taste and it need hardly be stated that the latter : valuable for feeding purposes. How- ıe differences in the nutritive proper- : meadow hay and straw-chaff made ather under-ripe wheat-straw, prepared rmented in accordance with Mr Jonas' ɔns, is not so great as might be ima- by some. A little cake ground into nd sprinkled over the chaff, would go obliterate the difference in the feeding of the two kinds of chaff. I would ılarly recommend for that purpose, a ich in albuninous compounds. Green n rape-cake, or decorticated cotton- added to the straw-chaff in but small ties, will bring up the per-centage of nous compounds, to what it is in good w hay. Best decorticated cotton-cake ns about 40 per cent.; green rape-cake 33 per cent.; and the finest linseed- from 30 to 32 per cent. of albuminous ɔunds. About 2 cwt. of decorticated -cake, ground into meal, and added to of fermented straw-chaff, presuming it e always the same composition as the : analyzed by me, I find, constitutes a e which agrees closely in composition ood meadow hay. Chaff, especially if nade from over-ripe straw, is not readily taken to by cattle, on account of its insipid taste and harshness; and considerable difficulty is experienced to induce stock to consume straw-chaff in as large quantity as is desirable. To meet this difficulty, several stock-feeders with whom I am acquainted, have found it useful, in practice, to use straw-chaff with some treacle previously diluted with sufficient water to impregnate uniformly the chaff with the sweet liquid. The only fault I have to find with this otherwise good plan of rendering chaff more palatable is, that the farmer has to pay from £13 to £14 per ton for the treacle, and obtains in that material only about 54 to 60 per cent. of sugar, the rest being water and impurities of no feeding value. By Mr Jonas' plan, straw-chaff is not merely made more palatable, but, as it is mixed with a little green food, it undergoes a slow cooking process, and becomes more digestible, and permeated by a delicate hay flavour. Thus the most is made both of the green stuff and the straw, and an excellent food is produced at a trifling expense, greatly superior in feeding properties to treacled ordinary straw-chaff, which costs more money. The great simplicity of preparing and storing straw-chaff, and the inexpensiveness of Mr Jonas' plan, are further advantages, which all may secure to themselves.

MR MECHI ON SEWAGE UTILIZATION.

'E have received the following from Mr Mechi upon sewage utiliza- —

: sewage utilization question advances ly and irresistibly, sweeping away pre- ', perplexing town councillors and s of health, and alarming rate-payers, aturally dread a new rate as an addi- ɔ their present burdens; but the sewage ceived legal notice to quit, so it must fertilize the land, instead of poisoning reams.

The novelty of the position embarrasses the public authorities, who are naturally anxious to do that which is most effective and economical. There is a growing conviction that at some future period, when the general use of sewage has proved its value as a food producer, that towns may be partially or entirely recouped for their present expenditure.

I receive such frequent inquiries from the various authorities, that I am induced to : you to insert in your pages the opi

have formed from my long experience in the use of animal and house sewage.

The first and most important point is, that the land to which the sewage is to be conveyed, should be deeply and thoroughly pipe drained, so that the whole of the sewage shall sink into and pass through it, leaving in the earth its valuable though disagreeable constituents, and issue from the drains as clear as pure water.

There are soils, such as chalks, loose sands, &c., that require no drainage, being natural filters. As a rule, light lands are to be preferred to clays, as they absorb and pass the fluids more rapidly, but the latter, when broken up deeply by steam, or other power, will absorb immense quantities, and produce great crops.

I prefer arable to grass lands for the reception of sewage, both on sanitary and food-producing considerations. It is especially suited for vigorous, deep-rooted, and rapid-growing roots, plants, vegetables, and fruit trees, that make the quickest return.

Now that the manufacture of sugar from beetroot is proved to be profitable, and that distillation is also on the cards, there arises an especially favourable opportunity for the use of town sewage.

Mr Duncan, who has the sugar factory at Lavenham, assured me that the sewaged beetroots at Mr Hope's and at the Barking farm, were worth about 16s. per ton for distilling purposes. Where the beetroot is to be used for sugar, it would be, I believe, necessary to thoroughly saturate the land some time previous to sowing the seed, to prevent too rank a growth.

Of the grasses, the rapidly growing and greedy Italian rye-grass is to be preferred, especially on light soils. The most perfect and practical instance I know of the utilization of town sewage, is, in my opinion, that on Mr Hope's Breton's Farm, near Romford, Essex, where, owing to that gentleman's liberality, public bodies are permitted to inspect it, on due application. The luxuriant and rapid growth of the numerous and various productions, afford unmistakable evidence of the food-producing powers of town sewage. Mr Hope pays 2s. per head, per annum, of the population of the town of Romford, who use the sewers. The town conveys the sewage to Mr Hope's farm, and there raises it 20 feet—all the rest is done at Mr Hope's cost.

Mr Hope's successful practice confirms my own decided conviction, that the sewage should pass direct from the town to the farm, and that settling tanks, deodorizers, &c., are a costly mistake.

The question of how, and where to take the necessary land, is a most important one, affecting the future interests of towns and cities. See what has taken place at Croydon. Land, which the Board of Health rented at £4 per acre, and which was previously let at only £2 per acre, has, now that the first seven years' lease has expired, risen enormously in price. They are obliged to pay £12 per acre by their new lease, on 300 acres, and, I believe, also on some 200 or 300 additional acres. Had they purchased the land outright at first, the town would have received the profit, which is now another's.

Norwich (with its 80,000 inhabitants) has made the same mistake, but in a less degree, having hired 1300 acres, at £2 per acre, for twenty-one years under the late Sir Robert Harvey. What will that be worth when the lease expires? The application of sewage and the growth of population soon give increased value to land in the immediate vicinity of a large town or city. Of course, corporations should have power to re-sell, mortgage, or re-let the land, so as to ease the demands upon rate-payers. My experience has taught me that sewage is a suitable manure for any and every crop when applied in proper proportions. As the manurial power of Britain is only equal to the deposit from three sheep or three human beings per acre, it appears absurb to propose to convey to each acre the sewage from 300 people. One might as well suggest that 300 sheep should be folded continually for a whole year on a single acre. The greatest of all nuisances, the sewage from more than 3,000,000 of people in London, still remains to be dealt with, and hangs in the

e of doubt and indecision. Something
oon be done with the northern portion,
Metropolitan Board of Works will
l their contract and resume its control.
uthern sewage is, I believe, still in the
sion of the Metropolitan Board of
. In the meantime a dreadful waste is
place. The residuum of the consump-
ily, of the produce of 20,000 acres,
s way to the Thames, obstructing its
l and poisoning its waters. Our sani-
formers who introduced closets and
e system, could never have anticipated
result of their system.

Lodge Farm at Barking, under the
ement of Mr Morgan, also affords
ant evidence of the productive power
n sewage.

vill be seen by the following extract
the speech of the chairman of the
ational Society, at the annual general
g on January 27 last, that the London
question is not in a very hopeful con-

The idea of putting the northern
from some 2,000,000 of people, on
res of land, is really monstrous. That
l to keeping 4000 sheep on 1 acre of
land for 365 days and nights in one year. There are thousands of acres of land in the immediate vicinity of the great outfall works at Barking, in which the sewage might be utilized if the lands were taken under Parliamentary powers.

"I regret to say, however, that the Board of Works absolutely decline in every way any assistance, either by funds or by guarantee; that they propose to confiscate our caution-money of £25,000, and that they have promoted a Bill in Parliament for the purpose of depriving us of the remaining period of the concession. It is, as I have said, a matter of great regret that they should have taken this course, contrary, as we believe, to all the equities of the case, and with the experience before them that the great mass of sewage furnished by the south side of the river has as yet found, we believe, not even a proposition for its utilization. The Metropolis Sewage Company, on their side, have therefore promoted a Bill before Parliament, by which they seek to alter the original scheme by substituting, in part, two iron pipes for the expensive brick culvert, and by stopping the works at Canvey Island instead of carrying them to the Maplin Sands, that is, to stop them half-way, or about 22 miles out of 44. They ask for powers also to purchase and irrigate Canvey Island, and other land, to the extent of 500 acres, and to discharge into the Thames, but so as not to create a nuisance, any sewage not used for irrigation."

WEEDS IN DRAINS.

By Mr J. J. Mechi.*

ANTS seem sagacious, for they never enter drains that are alternately wet and I mean into those pipes that have only ry away rain or surface water. But the becomes altered where a continuous of spring water, rising from below to ain, flows along it in a continual current. e is a tree or a fence within any reason- istance, it will send forth a root towards rain, will insinuate itself through the minute joints of the pipes, and there ating in the flowing and aërated water, se in bulk until, the size of a fox's tail mall birch broom, it will so nearly choke the drain that water can only filter slowly through the wig of roots; therefore, if you desire to avoid a heading back of water, and the injury or ruin of many acres of your crops, look sharply after your spring drains. This remark holds good equally as regards all the different kinds of plantations of trees or farm crops.

In my shrubbery an insignificant dribbling stream of spring water, which arose in the sand and gravel, and which was twenty years ago carried through clay by a line of small drain-pipes, became gradually impeded by the fibres of roots from some trees en

and filling the drain pipes. In consequence, there was a gradual rising of stagnated water towards the surface. The rhododendrons and other shrubs sickened, and gradually, in the course of years, died. I wish to warn my brother agriculturists against the insidious action of these gradually rising waters :— years before they are seen on the surface, their evil and chilling influence acts upon the young plants and crops, which look and feel sickly, but cannot in words enlighten you as to the cause of their sufferings.

The rising water expels the air, and as roots of plants require a change and circulation of air in the soil, for want of this they sicken, and at last die. These unexpected causes of injury and loss are most dangerous and extensive, and sometimes affect immense areas; the stoppage of a single drain may affect 100 or many more acres, for, as it is well known, a pressure on one portion of water becomes instantly a pressure on the whole—witness hydraulic machines. I have heard two millers say that, although a mile distant on the stream from each other, the letting away, or shutting off the water from one mill was instantaneously felt and known at the other. I will give a recent instance on my own farm of the result from the partial obstruction of a spring drain.

It may be well to remember that clay kept constantly wet will hold water like a basin, therefore, as on my farm, if there is an immense bed of subterranean sand filled with water, surrounded or opposed by a clay basin or wall, of unknown depth and thickness, the water in the sand basin is retained, and, when full, runs or oozes over the clay. In the meantime, this filled basin heads back water over an immense area. In fact, springs are formed by the rain-water, which, finding its way through porous soil, filters by gravitation through the subterranean sand, chalk, or loose gravel strata, and thus crop out at intervals wherever the porous stratum finds an outlet on the surface. Thus, water falling on high hills or mountains may follow the porous channels, and pass over or crop out on the sides of other mountains of inferior altitude.

On my farm we have cold white sands full of water, abutting against a wall of plastic clay of more than 150 feet deep. Twenty-eight years ago, I cut some deep drains through the clay, in fact tapped the wall that headed back the water, and thus lowered the water in the great sand bed to the depth of many feet, and prevented its rising to the surface and injuring vegetation. Swamps and bogs thus became dry land, through which the rains now descend and fertilize.

How far this sand bed extends I am unable to say, but the area of supply must be extensive, for one drain has yielded 25 gallons per minute for the last twenty-eight years, and two other drains about half the quantity. There has been a continual supply or deposit of very fine white sand at the outlet of the drains, which has to be removed from time to time. The water is brilliant, and of the finest quality, and generally at a temperature of 46 deg. both winter and summer, feeling icy cold in July and resisting frost in winter. The drains were 12 feet deep at the deepest part. These drains, after a time, emptied some sand pits on our heath that always stood 14 feet deep in water during winter. For many years not a drop of water has since been found in them; a pump some 600 yards from the drain lost its water, and would have to be sunk many feet to the level of my drain. On another portion of the farm, a 6-feet drain lowe redall the water of the surrounding district to its own level. These drains act abundantly, summer and winter, but more copiously in winter than in summer.

The main object of this paper is to communicate an interesting fact, as a warning to others, to prevent loss. My two great spring drains have continued their usual discharge, but with somewhat less velocity, so that there was no indication of anything being wrong. Two or three years ago, a part of a cottage garden, 500 yards from the drain, became wet and puzzled us, seeing that for twenty-four years it had been dry. Last year it was drained. Recently, the ground in the neighbourhood of our great spring drains shewed unmistakable wetness. Although there were no trees or fences near, and although the

drains discharged abundantly, we suspected that something was wrong in the drains. On opening them at a depth of 7 feet from the surface, we found them (although 6 inches in diameter) partially filled with what we call cat's-tails, occupying the pipes for a distance of 25 yards. As soon as these were removed, the outfall stream increased immensely in rapidity, and all the land became quickly dry and firm. We can now understand why the garden, although so distant, became gradually wet and unproductive. These cats'-tails had no connexion with the surface soil. I have found thistles many yards long in spring drains, and a slight development of leaf or head within the drain.

I remember a row of laurels planted on the side of an apparently dry ditch that would always look miserable and yellow and slow in growth, while their neighbours were of a dark green and vigorous growth. Suspecting something wrong, after a few years a deep drain was dug, tapped the subterranean water, and the laurels became pictures of health. Unseen water, making itself only felt near the surface, is a most insidious enemy to plants. If an accurate account could be taken of the annual loss occasioned to the British agriculturist and British people by the want of drainage, local and arterial, it would form an astounding and alarming total. If I am right in my estimate, much more than £100,000,000 sterling are required for draining, and it would pay somebody 10 to 15 per cent. annually.

This amount of money is but a mere trifle, for the money article of the *Times* recently congratulated us on having lent only £50,000,000 to foreigners last year. Never let me hear again of want of money for agricultural improvement. Only give the security on the land, and £300,000,000 sterling, or very much more, could be readily obtained.

But the pride of owning or farming a large area of poor or half-farmed land is a national misfortune, and must ultimately give way to more business-like and common-sense considerations. The nation overflows with capital and population; they both need employment, and then we shall be safe and happy, pecuniarily and politically.

To compel them both to emigrate, instead of producing us food at home, is a sort of national insanity and suicide. My experience of more than a-quarter of a century has taught me that there is no investment more safe, and few more profitable, than the improvement of land by drainage. deep cultivation, and plenty of manure, If we had been told forty years ago that in order to save time and facilitate intercourse, we should raise and expend £600,000,000 sterling on railways, such a proposition would have been looked upon as insane and impossible. But the thing has been done, and who can precisely estimate the many advantages that have accrued to this kingdom by the expenditure of such vast sums in mental and physical labour? To it must be attributed mainly our great increase in population as well as in wealth, dignity, and security. The same means would produce similar results in agriculture, by producing more abundantly, cheapening our home-grown food, and increasing the consumption of it by the employment of more labour and capital. At present the meanness of our agricultural produce is a disgrace to so wealthy and populous a nation. Its agricultural population scarcely knows the taste of beef and mutton.

The miserable annual acreable produce of £3, 15s. per acre indicates a lamentable condition of poverty, a want of enterprise, and an attachment to antiquarianism altogether inconsistent with our intelligent and steam-animated manufactures and commerce.

Let our great landowners and legislators ponder on this, and lend their powerful aid in the much needed freedom, improvement, and progress of British agriculture. The Board of Trade returns shew an area of cropped acres of 46,177,370, worth, according to my estimate, £25 per acre, or £1,154,434,250. Besides this there are many millions of acres still to reclaim and cultivate.

A WALK OVER THE FARM.

By Mr MECHI.

VERY seasonable weather — abundant April showers—so different from last year. What a splendid prospect for our 23,000,000 of acres of permanent pasture! Holders of old hay (who were not satisfied with £7 per ton) should look sharp, and get rid of their stock, or they will be caught napping. Lean stock will be in demand to consume the abundant grass that must follow these nice, seasonable rains. Walking over the farm to-day, I came to the pleasant conclusion that the crops never promised better than now. My crops are :—

	Acres.
Wheat	49¼
Barley, after wheat	6
Oats (after tares followed by cabbage)	6½
Spring beans	8
Winter beans	9½
White peas for picking	8
Winter tares (to be followed by cabbage)	6½
Red clover	24
Yellow globe mangold	7
Long red mangold	2
Spring-planted cabbage	2
Kohl rabi	2
Italian rye-grass (half first, half second year)	14
Permanent pasture	14
Total	158¼

I generally grow from 50 to 60 acres of wheat annually. About two-thirds of the land is a strong, cold yellow, plastic clay, or tile earth, when wet as slippery as butter, but yet as sticky as bird-lime. The natives call it a loving soil. The other third is an odd admixture of black sand, white sand, conglomerate or pudding stone, with narrow vertical veins of stiff clay at particular intervals — neither side of the farm contains naturally any calcareous matter, but a good deal of iron rust and some black peroxide. The light side of the farm is the most difficult and uncertain. It was once full of spring water, but deep drainage and very deep cultivation, some twenty-eight years ago, completely altered the condition of all the land; and it has ever since, aided by plenty of live stock and ample manure, produced crops that may fairly compete with some of the best in the kingdom. What has been done here might be done elsewhere, where there is will, capital, and intelligence.

Our wheats, drilled 8 inches from row to row, are sown, as usual, with 1 bushel of seed per acre. Date of sowing from October 20 to end of November. In two cases of very late sowing, the quantity was increased to 6 pecks after mangold, where the wheat does not branch so much. The bushel per acre appears abundant enough—rather too thick. As usual ½ an acre is drilled with only 2 pecks per acre, and that looks thick enough to be a good crop. My brother farmers had better come and have a look at it. It may remove some of their ideas about thick sowing. Mind, I don't recommend any general fixed quantity, which must depend upon a variety of circumstances; but I do object to and condemn the practice of always sowing the same quantity of seed without ever having tried, on half acres, comparative and various quantities. How can one know which answers best, except by comparative trials? I am very glad to see, in the editorial article of the *Agricultural Gazette*, of April 15, a recognition of the value of thinner sowing. I have been a good deal ridiculed, snubbed, and occasionally abused, for my agricultural proceedings. This I don't mind, because it is only what one might expect; but now that I hear and know of so many agriculturists in this and other counties who are quietly adopting these practices of mine which they once condemned, I do think it would only be right, manly, and for the good of their brother farmers, that they should admit and make known their change of

opinions and practice. Only yesterday, in the train, a farmer was strongly condemning the drainage of stiff tile earths in Essex as useless.

Well, I said, Mr So-and-so has lately drained his 400 acres and changed his opinion, having been convinced by the trial of half a field; but he has kept the fact to himself, and no one knows much about it.

My travelling companion seemed astounded and inclined to doubt the fact, knowing that Mr So-and-so's opinions were once, and for a long time, very strongly opposed to the utility or necessity for draining stiff tile earth. The same remark holds good in respect to deepening cultivation by my process of following one plough by another in the same track—trench ploughing. People seem ashamed to admit that they have been obliged by their own interest to change their practice and opinion, and adopt those which they at one time condemned or ridiculed. Personally, I do not complain of this; but it would be very much for the good of agriculture if farmers would candidly make known their changes of opinion, and the advantages they have derived therefrom.

But to return to the farm. Winter and spring beans look well. Barley (after wheat) well planted. Winter tares first-rate. Peas a good plant, and vigorous. Oats not yet up, having been sown after a double crop—tares followed by cabbage. Mangold gone in under favourable conditions, the land having been, as usual, heavily manured and deeply trench-ploughed before winter. Two and a-half acres of cabbage, planted in March, growing well. Two fields of red clover, full plant and healthy; 13½ acres of red clover, on stiff soil, sown last year in a heavy crop of wheat, is a thin plant, much of it having been destroyed by the summer's drought. We had intended to plough it up, but my experience has taught me that, if the weeds are kept down by hoeing, and if the land is in good condition, a clover plant will branch and spread out, and throw such strong stems that a very thin plant soon fills up; so we shall give it a chance. I do not attempt red clover oftener than once in eight years, and seldom lose a plant; the strong wheat crop is apt to dry it up more than a barley or oat crop. The late severe winter has raised, or thrown out of the ground, many plants of wheat and clover.

I have found our heavily loaded Crosskill roller most useful in pressing the plant roots into the earth again. For want of this, many fields of wheat have been ploughed up. All our wheats have been twice horse-hoed—a man and pair of horses doing about 12 acres a-day, at the cost of 1s. per acre. Wireworms have been most abundant and annoying; on one light land field, although 6 bushels of salt were ploughed in with the wheat, they commenced their havoc this spring. We immediately twice Crosskilled the young wheat, and sowed 8 bushels, or 4½ cwt. more salt per acre; the rain washed it in, and the consolidation rendered their quarters uncomfortable.

This saved most of the plants, which now look healthy. We saved a heavy land field of wheat after clover, by Crosskilling. On drained light loose land, the use of Crosskill roller and of salt, is much to be commended, and even on heavy land I never sow guano for my wheat or other cereals, without mixing it with at least 2 bushels, or 1 cwt. of salt per acre.

One of my heavy-land fields gives interesting evidence of the advantage of what is called high farming (drainage) deep cultivation, and plenty of under-cover-made manure.

In 1868, it grew 8 qr. of white wheat per acre after red clover.

In 1869, it was again sown with 1 bushel of Rivett wheat per acre, and produced 7½ qr. of wheat, and an immense crop of straw. There was no manure applied to the first crop of wheat, but for the second 2 cwt. guano and 1 cwt. of salt was ploughed in before sowing.

In 1870, it grew 39 tons per acre of long red mangold, &c., having my usual dose of 20 loads of rich manure per acre, and 3 cwt of guano and some salt; and now, in 1871, after mangold, it has again a fine plant of white wheat, from 1 bushel per acre manured with 2 cwt. guano and 1 cwt. salt. 1

at least 5 qr. per acre. So this will make three wheat crops and one heavy mangold crop in four years.

This I have often done, and it convinces me that the poor heavy lands of this country could do likewise under similar circumstances. The fact is, we don't half farm, having regard to profit for ourselves, and bread and meat for the people.

The absence of trees and hedges on this farm has not been found inconvenient or unprofitable. We have a nice shrubbery, of course, for the birds to rest in.

Live Stock on the Farm.—Eighty ewes with their 120 lambs. One hundred of last year's lambs sold at 54s. each, fifty of them yet to go away. Twenty young bullocks, now fat, worth, on an average, £18 each; they cost £6, 10s. each on July 20, 1870. Nine bullocks were sold, fat, at £24, 10s. each, about two months ago; they cost £9, 10s. each on July 20, 1870.

HOW TO HIRE AND HOW TO LET A FARM.

By Mr J. J. MECHI.*

I PRESUME we shall all agree that, for the good of the individual, as well as for the national welfare, it is desirable that the production of our food, as well as our other industrial arts, should be conducted with knowledge, intelligence, and capital. There is no greater mistake than to suppose that farming can be carried on successfully without those necessary qualifications, and thence arise those losses and disappointments of which we too frequently hear. Agriculture is a business requiring almost an apprenticeship of practical experience, quite as much so as the knowledge of navigation is essential for successful voyages. That experience must be varied if we have to farm under varying circumstances of soil and climate and business conditions.

According to the Board of Trade returns for 1870, the total area of the United Kingdom consists of 77,573,585 acres; its population 30,986,460. But the total amount of land under all kinds of crops, bare fallow, and grass, is only 46,177,370, of which 22,085,295 are in permament pasture. The population of Great Britain, including Wales and Scotland, in 1801, was 10,834,623; in 1870, 25,313,000. Ireland, in 1801, 5,300,000; in 1870, 5,525,210. The contrast in increase is painfully remarkable.

There are about 400,000 farmers in Great Britain, and 600,000 in Ireland, and as the average of adult life is probably but 50 years, it follows that must be about 20,000 new farmers annually—say 8000 English, Scotch, and Welsh, and 12,000 Irish, to fill the places of those departed. Some of these may perhaps benefit by the introduction and discussion of the important subject now before us, especially as we number in our Club some first-class land agents, land stewards, and land valuers, as well as landowners.

A very considerable portion of the land in Britain is entailed, and in few hands. It has been stated that one-hundred-and-fifty individuals own one-half of England, and only twelve hold one-half of Scotland. On many of these estates, especially in England, leases are not granted, but the holding is continued from generation to generation, so that in a great many such cases within my knowledge farmers would decline to accept a lease, knowing that their tenure is secure and their rent moderate. An eminent land agent assures me that out of 1500 farms, which he had let, only one-fourth were on lease. Still, as a matter of business, I prefer a long lease, because although it gradually increases rents, it gives confidence to men of capital to invest largely in modern improvements;

* Paper read before the Farmers' Club.

hey are, also, thus politically unshackled, nd if of a very independent temper, or omewhat hasty, protected against the malign nfluence of an occasional vicious gamekeeper, or a disagreeable steward or landlord. In Scotland, leases of nineteen years are, I believe, very general, and also very beneficial to the country at large.

HOW TO HIRE A FARM.

Our subject is a very large one, taken in all its bearings, because as it applies to the whole of the United Kingdom, we have very great variations in soil and climate, in modes of letting and tenure, in customs of valuation and times of entry; therefore, any one seeking success in a new district, or entering for the first time in the practice of agriculture, should put to himself the following questions :—

1. Do I understand the business of farming?
2. How much capital have I got?
3. How much credit can I obtain, so as to have the use of some other person's capital?
4. How much capital per acre shall I invest?
5. Shall I be my own baliiff and manager, or shall I employ another?
6. Where, and how shall I seek for a farm?
7. How shall I ascertain the general character of the land, the landowner, and his agent?
8. Shall the tenure be annual, or by lease?
9. What are the customs of the neighbourhood as to valuation of incoming tenant?
10. Shall I take live and dead stock by valuation, or let them go to auction?
11. Shall the farm be arable, pasture, or mixed?
12. Shall it be a rich natural soil near a river, a stiff clay, a hot gravel, a dry sand, a chalk, a limestone or a useful and moderately good mixed soil?
13. Is it near a good market for either buying and selling, or obtaining artificial food and manures?
14. Has it good roads and suitable buildings in a central position, with residential accommodation?
15. Are they in good or bad condition?
16. Who is to keep them in repair, remembering the difference between tenantable and substantial repair?
17. Has the land been well or ill farmed by the outgoing tenant?
18. Is the farm crowded with timber and fences, or are the fields of ample size, with neat fences, and free from trees?
19. Is the right of sporting reserved by the landowner?
20. Is the land naturally or artificially drained? If not, who is to do it, on what conditions, and at what cost or charge?
21. How much of my capital will be invested in incoming valuation for tillage, &c., live stock, farm horses, implements and machinery, horse keep, labour, &c., until a crop is obtained?
22. Is there a good style of labourers in the neighbourhood?
23. How much per acre are the tithes—great and small—the poor rate, surveyor's rate, and taxes?
24. Is there a good supply of water?
25. Are there labourers' cottages convenient or on the farm?
26. Is the farm in an improving district or in a backward one?
27. What are the proposed conditions as to mode of cropping?
28. Is the aspect or slope to the north or south, east or west?
29. How many feet is its elevation above the sea?
30. Are there means for irrigating the meadows, and what is the quality of the water?
31. Have the landowner and his steward a good name for liberality and justice, or are they said to be oppressive and unjust?
32. Will any portion, and how much, of my capital be required to be invested on improvements?

A CAUTIOUS COURSE THE BEST.

In seeking for a farm, get introduced to some first-class land valuer, who has a good reputation in his locality. If in a strange locality, make some quiet inquiries in the neighbourhood as to the general character, not only of the land, but of the landowner and steward or agent.

It is a good thing to stand well with land agents in rich districts not over-rented. If you advertise for a farm, you have plenty of offers, but too often of the wrong sort in some way or other, such as a rack rent, an unpleasant landlord, too much game, or inferior soil. Farms hawked about or advertised require a very cautious approach. Farms having a bad name in the county are often advertised in distant counties, and a clever agent will take care to meet the applicant at the station, accompany him to the farm, dine him, and see him safe off again by railway.

As a rule, a good or acceptable farm seldom comes into the market, for before the late tenant is deposited in his grave some wide-awake farmer has made his application.

and generally there are several applicants for a single farm. An Essex landowner told me that he had twenty-three worthy competitors for one farm. Land agents or land stewards have generally in view some good men, who get notice of an approaching vacation. It is very desirable to hold under a landlord who, having plenty of means, effects improvements by drainage, proper buildings, &c. The tenant's capital is then free and available for tenant's investments, and it always answers to pay a fair per-centage on landlord's capital invested in suitable improvements.

A rich farmer can sometimes make good terms with the dilapidated landowners of poor unimproved land, requiring capital and improvements.

In a district new to you, obtain a few catalogues of farm sales, which will enlighten you as to the probable requirements in live and dead stock, machinery, and implements.

FARMERS' CAPITAL.

Fit your farm to your capital: £1000 to every 50 acres would not be too much for high and improved arable farming, and not enough if you find it necessary to improve the farm. The question of capital is too important to be passed over lightly. Modern agriculture, with its costly implements and machinery, and extensive use of artificial manures and purchased food for cattle, and its maximum crops, is a very different affair from the old pastoral and *laissez faire* system. In Scotland, where farms are let to the highest bidder for a nineteen years' lease, the tenant is often expected to make a considerable outlay in drainage, at a cost of some pounds per acre. Liming or chalking and claying frequently absorb several pounds per acre of tenant's capital. On my farm, which requires plenty of manure and deep cultivation, I cannot prosper with less than £16 per acre, invested as follows:—

	£	s.	d.
Live stock	6	0	0
Farm horses	1	0	0
Tillages, &c.	3	15	0
Implements and machinery...	2	10	0
Hay, corn, &c., unsold ...	2	15	0
	£16	0	0

If I diminish my quantum of live stock, I diminish my supply of manure, and, consequently, get smaller crops and less profit. I could do better with £20 or more per acre. We hear a good deal about £10 per acre, but it is now quite insufficient in an arable district.

If you have a wealthy and judicious landlord, willing to aid in progressive improvement, it will answer your purpose to pay from 5 to 6 per cent. for drainage and extra buildings where required.

If you desire to be secure in your tenancy, buy the land, and mortgage it for a long period at 4½ per cent. As a farmer you should gain 10 per cent; as a landowner you can only expect 4 per cent. Our system of separate landowning and farming is far superior to wretched poverty-stricken peasant proprietorship.

If you come into a district previously unknown to you, your success may depend upon a change of crop and of practice suited to the soil and climate—if they differ from the one you have quitted. Scotch farmers from among the cloud-capped hills and vaporous atmosphere, where a turnip crop is a certainty, must expect and prepare for a totally different arrangement in the dry, level, and cereal eastern counties, where spring-sown wheats and early-sown turnips are almost sure to fail, and where top-dressings in spring are not at all to be depended upon.

I have seen much capital wasted by laying down to grass land quite unsuited for it both in soil and climate. Our dense tenacious non-calcareous clays, which are like bird-lime in winter, and dry like cast-iron in summer, are quite unfit for permanent pasture; and yet by deep cultivation and frequent horse-hoeing, splendid crops of mangolds, beans, and wheat, can be grown on them; also tares and clover.

Unless you have a sharp local man to value on your behalf, you may be extensively victimized. In the affairs of this world men are not saved by faith, but rather by the want of it; therefore have every agreement or understanding clearly defined in black and white, on properly stamped documents.

HOW TO LET A FARM.

ner of naturally fertile soil has much
ulty in letting than the owner of
niddling land. Good tenants, like
dlords, are much sought for, and
a preference. There are certain
nown to have capital and talent,
lmost pick and choose their farms.
ons have the confidence and respect
tewards, who naturally feel highly
le to their employers in the matter
ting their land. It is easy to say,
ound the lessee to strict covenants
se of cropping," but that avails but
any cases. A bad farmer will keep
ck, cultivate little and badly, hoe no
uy no cake, but sell all his corn,
ack no manure.

ighly desirable, when you have a
improving tenant, to keep him on
to aid him in his improvements, and
l of his lease make equitable arrange-
d not compel him to leave the farm
rging him on his own improvements.
system of out-going valuation of
improvements would remove the
n of demanding extortionate rents.
f our Scotch farmers get sadly pun-
he end of their nineteen years' lease,
ve they have no claim for drainage
ermanent improvements, and farms
lly or frequently advertised to let
hest bidder. As a natural conse-
any Scotch farmers are driven to
er land of the south, while their
farms fall into the hands of men
ust their improvements, impoverish
s, and cannot sit out the lease. I
to learn, from a competent autho-
many Scotch leases are pre-arranged
before the termination of the old
his is to be commended, for it pre-
haustion of the soil, injury to
, and damage to the general wel-

nts and bad farming generally go
hand, for the obvious reason that
vement impoverishes the land and
s its rent. I think that where a tenant understands his business, and invests from £14 to £20 per acre capital on the farm, he should not be restricted as to cropping or selling hay, straw, or roots, excepting for the four years preceding the termination of his lease. [A member present having demurred to the statement that £20 an acre was a good investment, Mr Mechi said he had it on the authority of a large Norfolk farmer who was in the room.] With such a capital there must be plenty of fat live stock, which is a certain guarantee for the fertility of the soil. He should of course be bound to consume on the farm a quantity of corn or cake equivalent in value to the straw, hay, and roots sold. The growth of beet for sugar-making or distilling will necessitate high farming.

Stringent clauses in the lease should bind the tenant to keep the ditches and outlets of drains open and in good condition, to trim the fences annually, and keep the farm roads in order, providing they were in proper order when he hired the farm. Seeing how varied and varying is the human temper, it is not to be expected that everything will always go on smoothly, therefore it is desirable to have a clear and well defined understanding or agreement at the commencement, with a hope that all will prove harmonious and pleasant. A wise landowner will have his farms of various sizes, adapted to varying capitals. From the recent Board of Trade statistics we learn that there are plenty of small farms in the United Kingdom. Industry, frugality, and talent are the parents of capital. I know many large farmers who thus created their present large money capital.

CONCLUSIONS.

It is quite clear that the landowners of this kingdom have not the capital, or, perhaps, the skill to farm their own land, or even, in many cases, to make the necessary improvements; therefore every proper encouragement should be given to those who make farming their business and means of existence, by granting leases and proper valuation for tenants' improvements, also the right of sale or transfer.

The advantage of such a system finds its evidence and illustration in every British town and city—Belgravia and Tyburnia have been raised upon cabbage gardens, not by the owners but by the lessees, who make their calculation of profit on a prolonged lease. Similar results would follow in agriculture under similar conditions. A landowner might increase his rental, and get permanent improvements effected on his estate by granting, to men of capital and enterprise, leases, varying from twenty to fifty years, with powers of sale or transfer, and the sole right of sporting and freedom from political dictation. Were this done, the change would be almost magical—agricultural Belgravias and Tyburnias would soon present themselves; first-class homesteads, residences, and labourers' cottages would quickly supersede the present mean and shabby, inefficient farm arrangements. Good roads, square fields, and good fences would come as a usual consequence; wet lands would become dry and sound by drainage. Unfortunately, the laws of entail considerably bar the way, but must ultimately be modified. Where a landlord treats his lands simply as a means of obtaining an income, all this might be reasonably done. Of course there might be a sacrifice of political influence and rights of sporting, but, practically, the relative influence of Whig or Tory would not be altered were the practice I have named to become general. Capital will never flow amply and freely into the agricultural channel until this is done, and then the meanness of British agriculture would disappear, just as in our great cities, where enormous outlays of capital under secure tenure and political freedom have superseded the mean buildings and residences of antiquity by comparative palaces.

The Garden.

THE CULINARY DEPARTMENT OF THE GARDEN.

HE Culinary Department of the garden is much too often underrated, and quently neglected. The common run egetables is easily got at, and Nature bountiful in her supply of food, a respectable return is forthcoming in at the expenditure of little labour, little

Time was when the masses were con- d with little variety in their bill of fare, r from habit, partly from a supposed sity, and many valuable esculents were utilized by the few. Many gardens of poorer classes were solely planted with 'otato, because it was looked upon as a article of diet. That it has been so, not gainsay. Its value, both from an mic and a nutritive point of view, is r inestimable. It has been a means of nting famine in other countries than our

But there are other vegetables, both able and valuable for their health-pro- ng qualities, that many, so to speak, have estranged from, demanding more general iety. The masses are duly appreciating ty of food whenever their circumstances it them to possess it, and all classes are erned in the population being well housed decently fed. As a rule, the rural popu- n, especially in northern and highland cts, know less of culinary excellencies culinary delicacies than "the dwellers ties." The former cultivates his own en, and his Potatoes, Cabbages, Carrots, ns, Turnips, and Leeks; the latter has Brocoli, Peas, French Beans, Scarlet ners, Brussels Sprouts, in addition to is named above, regularly from the et, as they are produceable in season. he has not only these substantial helps s beef, and mutton, and pork, but often some other form of salad—it may be Cucumber, Lettuce, Radish, Celery, Endive, Mustard, or Cress, which form a very pleasant and palatable "top-dressing," and have an excellent effect upon the system. Some of those who abide by what they call the good old system of living, and who are lamenting in a somewhat cynical and morose spirit, over the degeneracy of the present age, will be alarmed at our views, and maintain that those who follow the spirit of them will rapidly injure their physical system. The balance of proof, however, is entirely in the opposite direction; and if we could insist upon moderate potations, and a proper use of animal and vegetable food combined, the *physique* of our race would stand favourable comparison with that of antient times. True, we could not furnish individuals that could pitch a bar with Hercules, or bend a shoe with Augustus King of Poland, or wield the ponderous sword of Wallace, but we should have a healthier and happier race, with more of its representatives living out the "three score and ten years."

The products of the kitchen garden, then, are of paramount importance. As Loudon has it, "they form the chief luxuries of the tables of the rich, and a main support of the families of the poor." The middle classes, and indeed all classes, relish them now to a wonderful degree, and the question with us naturally arises—How can we best advise our constituents on the matter in hand? Are we to enumerate a collection, or are we to upon the assumption that that already is ficiently known, and that our re ks wo be more valuable in nomina ı ec- tion? The enumeration of a coll ı is simply catalogue-work, and the

ducing of a catalogue of names would be by no means instructive to those who look mainly to us for guidance in gardening matters. There are Potatoes *and* Potatoes, Cabbages *and* Cabbages, and so on, through a whole culinary list, and hence the value of selection to those who have not had experience, or practical knowledge of some form or other, as a basis for individual guidance.

It is our purpose, therefore, to place before our readers some old things that have been well tried, and found not wanting, and some new things that have had less general trial, but trial sufficient, by competent authorities, to prove the trustworthiness of the articles recommended. We are enabled through the kindness of Messrs Carter & Co. to illustrate some of the more important, which will bring the objects more prominently before our readers, and enable them, in some measure, to form a judgment for themselves. It may be explained at the outset that we shall merely name a very few in each class of proved sorts, and refer more in detail to the novelties as being a kind of information that will be more generally instructive. To accomplish this in anything like a satisfactory way, will require a series of papers. That the information intended to be conveyed may be seasonable, we shall, meantime, select such vegetables as may be sown during the month.

THE PEA

Is represented in a host of varieties, many of them so similar as to be scarcely distinguishable to the most critical eye. There are, however, many very excellent sorts which have had a character at first, and maintained it. It is too late now in the season to recommend a general list. True, most of the sorts, in an average climate, would bear the kind of culinary samples that an epicure demands before frost puts in an appearance, but many will have their Ne Plus Ultra, Champion of England, or Veitch's Perfection, in the ground ere these lines meet the eye. And if these were the sorts selected and sown, we should not be inclined to say a single word against the selection. No better late Peas than these have been grown. The first named is the type of a most excellent batch; the second, although not quite so prolific, is about the best flavoured wrinkled Pea at command; the third is more of a novelty, and bears a full average crop of well-filled pods containing large Peas. The first

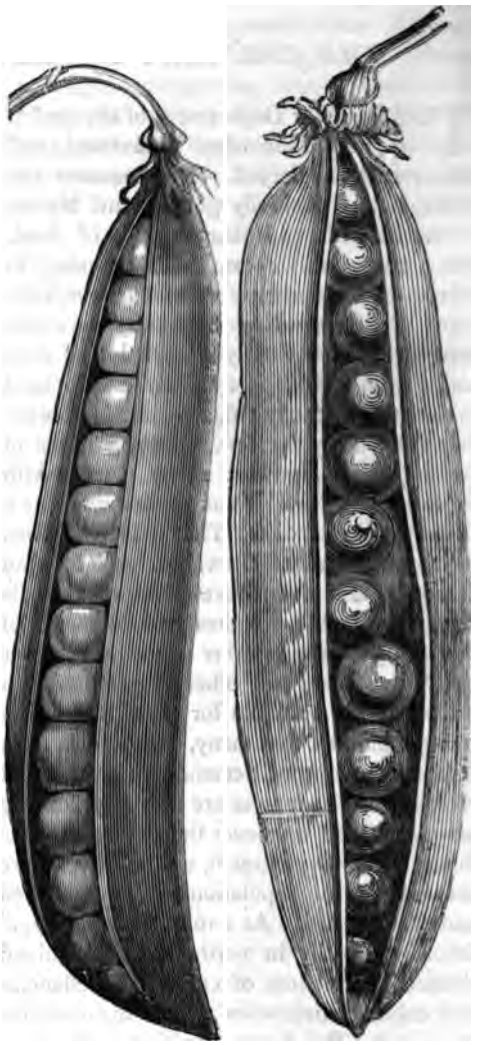
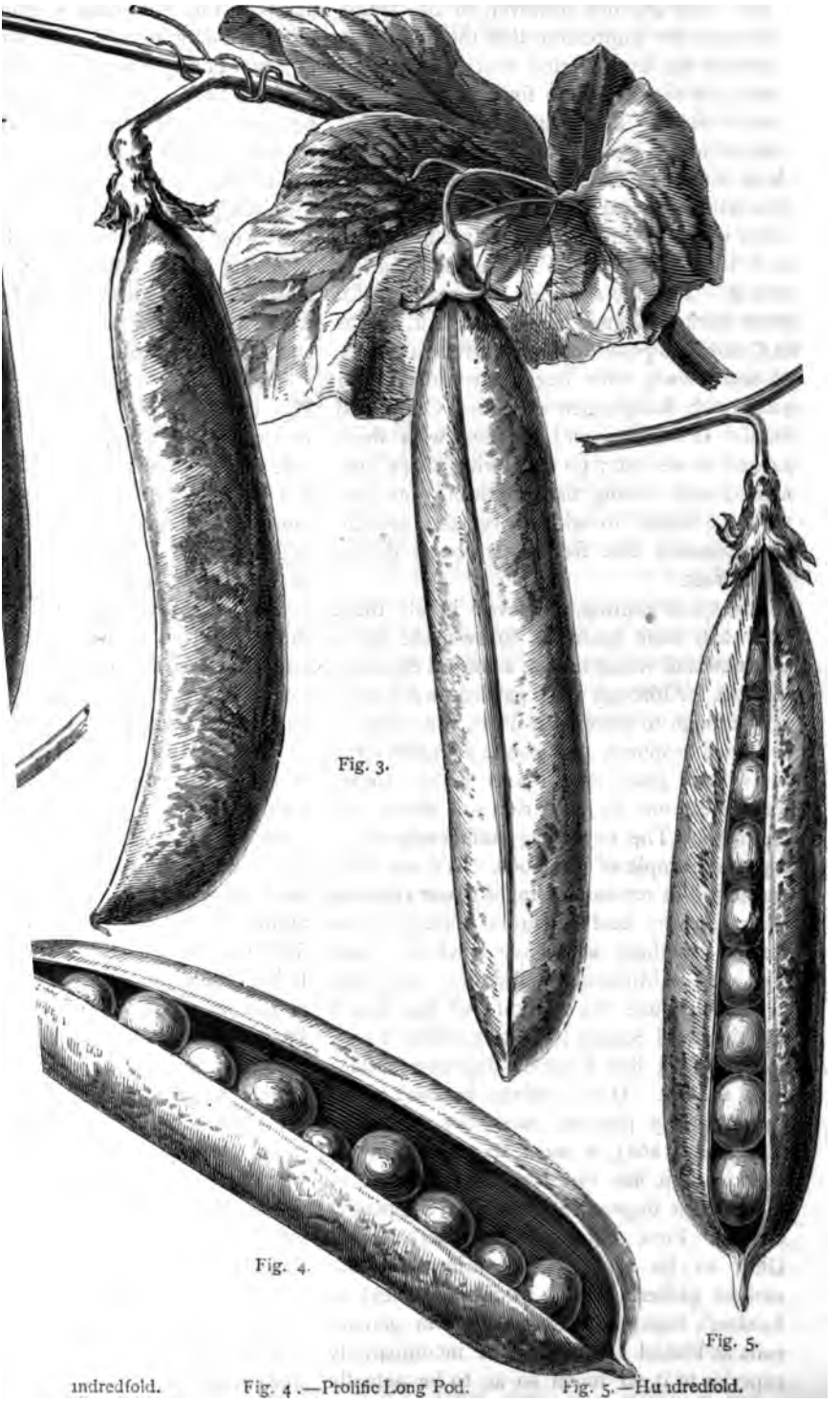


Fig. 1. Laxton's Supreme.

Fig. 2. Laxton's Prolific Long Pod.

and the third had better not be sown later than the first week of May, as no one can depend upon a full crop of either much after that time. You may get a catch crop, but far better look forward to some degree of certainty than sow and be disappointed in



ındredfold. Fig. 4.—Prolific Long Pod. Fig. 5.—Hu ıdredfold.

yield. You are not, however, to be carried away with the impression that the first week of May is the latest period of seed-time upon which you may calculate for a safe and productive yield. There are other sorts which mature many weeks earlier than either of those named. The Champion of England even will mature at least ten days earlier than either of these named, and many others, such as M'Lean's and Laxton's sorts, much earlier than it. To have a proper succession fit for table during August, September, and as far in October as possible, there must be a variety of sorts sown. We begin, say early in the year, with Ringleader, or First Crop, and Daniel O'Rourke, and we end with them as well as we can; go on sowing these last-named sorts during the month of June, and they are found to bridge over the vacuum of succession that frequently occurs during September.

What was wanting, however, in all these very early sorts promises to be made up in that new and valuable sort, Laxton's Supreme (fig. 1). Although villa gardeners are anxious enough to have early Peas, they like to see good croppers, and, above all, good large pods and good sized peas within them. This one grows in good rich soil about 3½ feet high. The engraving sufficiently shews a proper sample of the pods. We are fully warranted in recommending it to our readers, from the very best accounts placed at our service by those who have tried the sort. To give additional confidence, we may as well produce the warranty of the Royal Horticultural Society:—"It is fitting that a splendid Pea like Laxton's Supreme should head the list. It is a variety destined to become largely popular, especially as during this year (1868), a most trying season for new peas, it has developed a character in the highest degree satisfactory. Supposing Carter's First Crop or M'Lean's Little Gem to be used as a variety for the earliest gathering, there would come next in Laxton's Supreme, quite as early in general soils as Daniel O'Rourke, but incomparably superior to it, so much so as to be actually without the range of comparison. It worthily deserves the First-class Certificate a by the Committee." This sort, the be sown during this month and in th week in June. In some localities it be sown later, but much depends climate. Early autumn frosts cut t son of Peas very much shorter, and, j from the past, there is no security on u and by the side of streams and rivers f withering hostile influence, even in ear tember. Deep soils and mild moist lo are in demand for prolonging the sea even till late October.

Laxton has raised many excellent His Prolific Long Pod (fig. 2) is one best of second early Peas. It is mo able from a prolific point than Supren has larger peas set in a much broa more inflated pod. This is a splendi ing pea, of a better flavour, and in every way, than Harrison's Per a very excellent variety. It was those reported upon at the Chiswic and received the highest badge of tion. Sown any time during this m will come in valuable during autumn

But the Messrs Carter have not be in the matter of rearing new sorts own seed farm. Knowing the con value of Laxton's Prolific, on the on and Ne Plus Ultra, on the other, the work crossing these two valuable so among the out-come is one named H fold Pea, or the Cook's Favourite It is desirable to have peas dished of a hue as possible, and Ne Plus U Payne's Conqueror, is about the best r tative, taking colour and quality comb have. Laxton's Prolific is not so. so, it would be all but perfection. T ing of the two has supplied the desi we speak of, and hence, we pres raisers, anxious to popularize the cha the progeny, without compelling all follow a wordy certificate, has nar sort "The Cook's Favourite," from tinguishing cast of colour and flavc "Hundred-fold Pea," to attract the e market gardener. One of our co dents, who saw it, reports, "that it

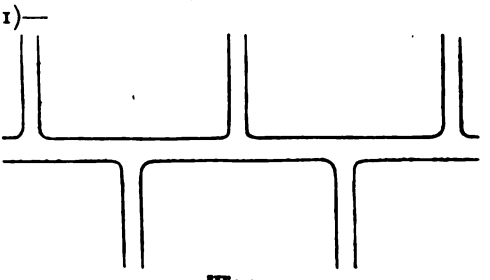
tinguished of a batch of seedlings. alongside of it was nearly so prolific, emed to have a capital constitution. early 4 feet high, and the haulms rally hanging with well-filled, slightly pods. On opening one of them, the re large, round, and of a fine tone of The flavour of them, in an unboiled is very palatable. The pods were of length, containing from seven to eight each. I believe this will turn out to luable new sort." Other authorities ell of it, and the firm itself, which putation to lose, consider the gain of nportance. We therefore commend readers, believing that it will justify ave said of it. It is considered as he late varieties of the early section, later by a fortnight than Supreme.

ier excellent Pea which we commend ce before our readers, is M'Lean's . This is one of the green wrinkled s that find so much favour with many. er, it is a late sort, much later than he sorts we have enumerated, and on that account. Late sorts, as a not so liable to mildew as some of the earlier maturing ones, and that of itself is an important gain. Besides, this is one of the very best gains of a raiser of great repute, and this invests it with all the more importance. We are often inclined to look upon with doubt seedlings that originate from unknown or unfamed hands, and seeing the amount of trash that is palmed upon the public year by year, there is little wonder. Whenever a raiser of fame risks his reputation, by sending out with a flaming character, an indifferent article, his productions afterwards, however good they may be, are looked upon with suspicion. Dr M'Lean, in the raising of Peas, has made a name, and maintained it, too, not second indeed to Laxton, and we accept his "Premier" as one of the best of his efforts at cross-breeding. We give the Royal Horticultural Society's Certificate in its favour:—"M'Lean's Premier Pea is a green wrinkled Marrow, about 3 feet 6 inches high, a few days later than, and not of such a succulent growth as Veitch's Perfection; a very reat cropper, the pods of a large size, seven to nine peas in each pod, and of excellent quality; a first class Pea, and said to be Dr M'Lean's best."

PRACTICAL HINTS ON DRAINAGE.

LLOW drains are useless in gardens. hey soon get blocked by the roots of vegetables. We have seen Brocoli ion roots 4 feet deep, and a deep, verized, carefully enriched tilth, is the secret of perfect flowers, and sweet, uicy vegetables. Though the roots trees should not be allowed to pene- far, yet they will be all the stronger healthier if no stagnant water comes 2 feet of their lower extremities.

frequency of drains, and distances nust depend a good deal upon the soil. e of from 15 to 30, or even 40 feet, ng to the soil, must be allowed. From 4 feet would be a safe average distance. The more tenacious the soil the nearer the drains, and *vice versa*. Sometimes one drain is made much deeper than the others, perhaps 5 or 6 feet deep, and the others are herring-boned into it, thus (fig. 1)—



[Fig. 1.

But in this mode it is safest to turn the

tributary drains in with a bend or angle. Thus (fig. 2)—

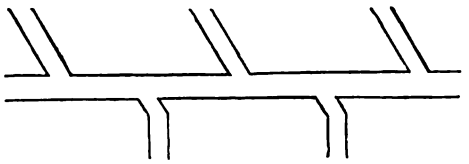


Fig. 2.

This mode of discharging the tributary into the main tends to prevent blocking, and by intersecting each other two systems of collection are combined. Neither need the tributaries be so deep as their so-called mains. Of course such mains are likewise collectors. Supposing two or three of those deeper, larger drains were placed at 40 feet apart, and the side bones of the herring's back were inserted about 15 feet from each other, the drainage could hardly fail to be thorough.

The direction of drains is a controversial question. Shall they go straight, up and down the natural fall, or cross it at right angles, or obliquely, and at what angles, are all points that have been hotly contested. Our readers may safely choose the course that is most convenient and easy for them. In doing so they must of course have their eye upon the best outlet. This secured, it matters little in practice how the drains cut the strata, lying perhaps yards below. Let the drains be sufficiently deep, close enough together, and of sufficient capacity, and they will do their work very well, run how they may. It is, however, indispensable that they shall run—that is, have sufficient fall. The greater the fall, and the more porous the land, the faster the water will be removed. When the ground is inclined in any one direction, as is mostly the case, the drains may be of the same depth throughout. But on dead levels they must fall at least 1 foot in 200 yards. One foot in 100 yards would be better still when it can be readily obtained without going to any great depth. But if the water will only run, that will suffice. An excess of fall may occasionally be an evil. Water is not a thing to be rid of at any price, but a power to be utilized, to the enrichment and amelioration of the tilth of the earth. Provided that the water is not allowed to stagnate, it need not be too hurriedly removed.

The heat capacity of drains is a point of great importance, and closely related to the materials employed in making them. Of course, where stones are plentiful on the spot, stones are used, though no materials are equal to pipes of tile or rough earthenware. Stone is for the most part used in two general forms. Either rough broken into coarse irregular lumps, allowing the water to pass through anywhere, or as slabs or splinters. The latter are mostly used in an angular form.

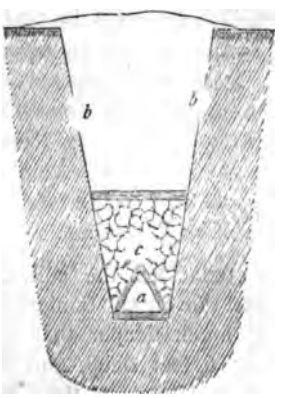


Fig. 3.

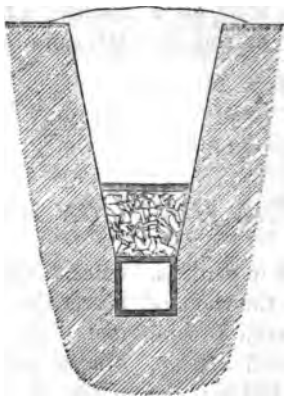


Fig. 4.

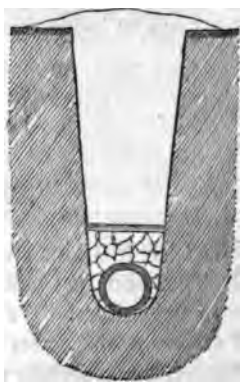


Fig. 5.

Thus *a* (fig. 3) is the bottom of the drain, *b*

e stone slabs or splinters forming the sides, d *c* are rough pieces of stone keeping up e slates. This rough rubble collects and nsmits the water, while the whole angle rms a clear channel for conveying the water way. An equally or more common form of tone drain is four square thus: it consists f two sides and a cover. On heavy land the ides are often dispensed with, and the ottom part or 6 inches of the drain (fig. 4) is eft narrower than the portion above it, and he covering slab only is used. On very stiff lays this plan answered well. But on friable oils the earth sides are apt to give way, to he ruin of the drain. Whatever form of tone drain is adopted, a few loose stones hould be laid over the top of the stones orming the drain, and these, again, should lways be protected from the fine soil sifting down into them by means of an inverted turf, or by a thin coating of straw laid over the stones.

But tiles are the best of all materials for forming drains, and they are now too well-known to need description. For gardening purposes, what are called socket tiles, or spigot and faucit tiles, that fit pretty closely into each other, or collars to put over any joint, are the best, as they tend to keep out the earth and deep boring vegetables. And then, again, as to the size of the tiles, there is no doubt that tiles of 1 inch bore in drains, say 24 feet apart, would remove a fall of 2½ or 3 inches of rain in twelve hours, a fall quite unprecedented in our climate. Still, drains in gardens ought to be deep, as they are more liable to block than those on farms, and it is more difficult to get at them. We should recommend 2-inch tiles for the ordinary drains in gardens, and 3-inch for the mains. As to the form, they are made of various shapes, mostly high semicircles and rounds. The former, again, are used without soles or flat pieces of tile to stand upon. Some, again, use one tile, others two or three, to form the drains. All these matters are questions of detail. Possibly, there is no better mode than that here shewn (fig. 6), of a single tile in the bottom of a drain.

The mode of digging out is important. The smallest possible area should be removed, and the bottom excavated with a narrow spade. This provides a maximum depth with a minimum amount of work, and likewise allows the tiles to lie firmer in their lonely beds.

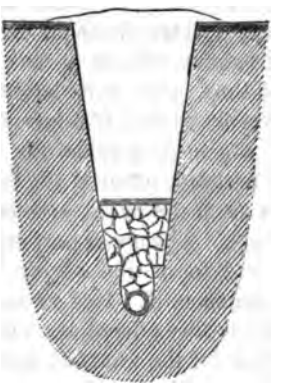


Fig. 6.

Finally, the outlets of drains are of vital import. They should be several inches below the mouth of the drains, and in no case should they empty themselves into an open ditch. This ruins and blocks more drains than any other evil. Mice, rats, and other vermin make homes in the drains, and undermine, block, or ruin all. The roots of rank weeds likewise feed around the outlets, and finally occupy and block them up. All the small drains ought to discharge into one large one near the extremity of the garden, and the one, or at most two outlets of the latter should be securely barred with iron gratings. The water from such a main would flow with sufficient force to keep a clear path for itself. Or, if ever it was otherwise, it would be easy to find and clear one outlet, whereas, some of the many small openings would be sure to be neglected. It is impossible to recount the trouble experienced in gardens from unprotected drains. It is not only that they get blocked and stopped, but all kinds of vermin come to us to torment us through these dark subterraneous passages. They burrow in the garden, undermine the house, and are ever ready to make a raid upon our choicest fruits, vegetables, or flowers. It is almost bet not to drain at all, than not to block

guard the entrance to garden drains with iron bars. These allow the water to pass out freely, and say to all vermin, with an authority that must be obeyed—no admittance here.

In many gardens, too, it would be well to keep the water inside. It could be formed into a lake or conveyed into a tank for use against a dry time. We have lately had the new Chatsworth edging tile introduced to our notice, which is a drain tile as well. The bottom part is a grooved slit to receive all the water from the walks, and convey it to tanks for use. The upper portion fits into this groove and forms the edging, at once elegant and ornamental. It is a combination of utility and beauty offered at a cheap rate, and well suited for the wants of amateurs.

As to the cost of drainage, that depends, as country people say, if you ask them, upon what you seldom get—an answer. The cost of drainage, then, depends mainly upon its depth, the state of the labour market in the district, and the character of the soil to be drained. The following, however, are the prices given by one of the greatest authorities on draining—Mr Parke:—The average expense of drains 4 feet deep, laid with 1½ inch drain pipes at the following distances, will range from three guineas to five pounds per acre. Two-inch pipes would cost a trifle more, but, as will be seen from the following table, the tiles are really a small item in the expense of drainage.

Distance of drains apart.	Total length in rods of 74 yards.	Cutting and Filling at 8d. per rod.	Pipe laying and superintendence.	1½ inch pipe at 13s. per rod.	Total cost.
Feet	Rods	£ s. d.	s. d.	£ s. d.	£ s. d.
24	86½	2 17 8	14 5	1 3 7½	4 15 8½
30	69	2 6 0	11 1	0 18 10½	3 16 4
33	63	2 2 0	10 6	0 17 2	3 9 0
36	57½	1 18 4	9 7	0 15 8½	3 3 7

From this table it will be easy to calculate the approximate cost of draining a garden. Something will have to be thrown in for small operations, as a few days' work does not pay so well as a heavy job that takes six weeks or two months or more to complete it.

Drainage is hardly work for villa gardeners. It is best performed by men who make it their special business. The work is hard and and dirty, and fairly paid. It is well, however, for the owner of the garden to see the bottom of any drain, and even to test the fall before the pipes are laid. Scamped work in drainage means the loss of all.

Finally, some cultivators assure us we have drained in excess. They father our recent severe droughts upon our drainage operations. By removing the surface water we have parched the earth and scorched the air. Such views are altogether mistaken. Drained land is more moist during summer drought than undrained. Drainage not only lets the water out of the land, but it keeps it in. It likewise draws up more moisture by capillary attraction, from the deep water cisterns of the earth, and collects or condenses more aqueous vapours from the air than undrained land. Besides its superior products present an effectual barrier to the drinking capacity of the sun. The finely-comminuted earths of drained lands act as screens, to prevent the loss of water by evaporation, while they drink in the cool night dews at every pore. Drainage is thus as much or more a re-distributor—a utilizer, a husbander of water, than a simple instrument for its removal. It removes water from where it is not needed, to where it is. It makes it do useful work, in ameliorating and enriching the earth, in supplying the needs of plants, and in assisting them to change the raw materials—earth, air, water, gaseous heat, light—into all the finished products of the vegetable kingdom.—*F.*]

NEW AND RARE PLANTS.

ORTHOSIPHON STAMINENS.

THIS is a highly useful decorative plant, introduced by the late John Gould Veitch, from Cape York. It is one of the Labiates of herbaceous character, easily cultivated in a warm greenhouse temperature. We have tried several East Indian species, they are nearly all out of cultivation. Such one promises to have a better fate. Where variety is in demand, this plant is sure to be cultivated, if for nothing else than the peculiar length of the stamens, elongating to twice the length of the tube-like corolla, as portrayed in the engraving, fig. 1. The habit of the plant, and the profusion of its inflorescence, are all that can be desired, as shewn at fig. 2. We append Dr Masters' diagnosis of the plant:—

"The plant is herbaceous, with numerous much-branched purplish hairy stems; the leaves are ovate or deltoid, tapering at the base into a short petiole, coarsely and irregularly toothed, dark green above, with a purplish mid-rib, glaucous below, with whitish hairs along the veins. The flowers are very numerous, arranged in verticillasters, a

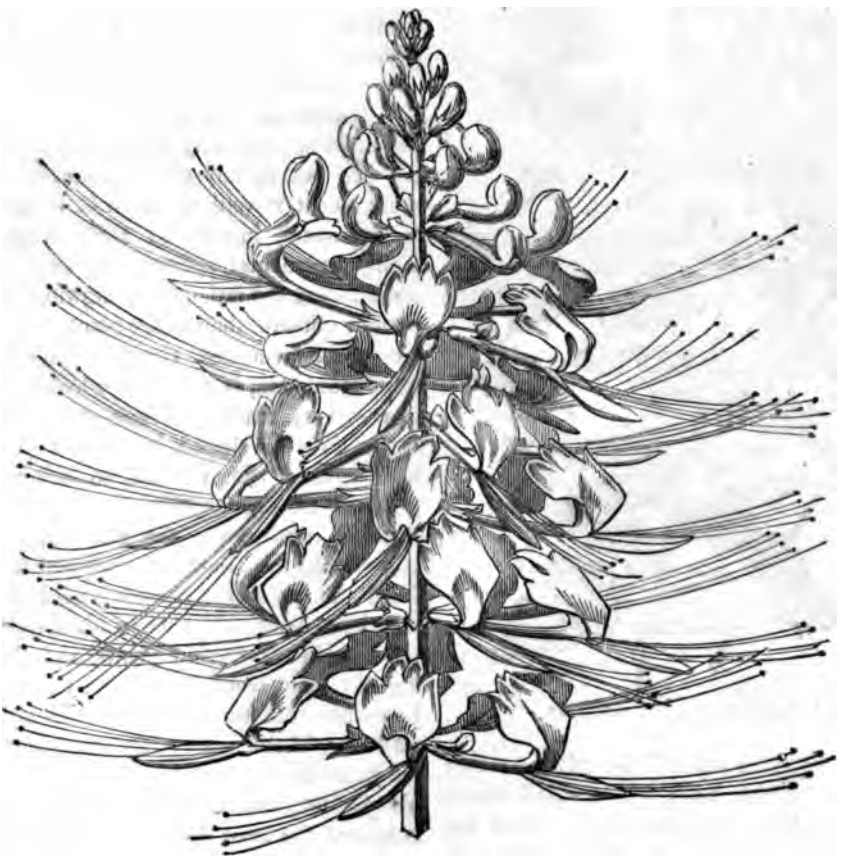


Fig. 1.—Orthosiphon staminens—full size.

these, again, in racemes at the ends of the branches. The calyx is leafy, tubular below, two-lipped above, the upper lip roundish, the lower one divided into four linear-lanceolate ciliate purplish teeth. The corolla is nearly 1 inch long, pale lilac blue in colour (sometimes white), with a straight tube projecting

Fig. 2.—Orthosiphon staminens.

for some distance beyond the calyx, covered with long whitish hairs, and divided above into a two-lipped ringent limb. From the beauty of the flowers, and the profusion with which they are produced, there is little doubt that this plant will be a favourite with gardeners."

CYPRIPEDIUM HARRISIANUM.

Lady's Slippers form a special division in the great family of Orchids. The form of the flowers commands general attention. The colours are generally tame, but in all admirably blended, and the substance of the flowers is so remarkable that the duration of the inflorescence is maintained longer than in almost any family of plants. Like all other families, some members are more ornamental than others; however, there is not a single species that has been brought into notice, but what has had many admirers, and, consequently, all are cultivated to a greater or a less extent. Our European Lady's Slipper is a most beautiful species, admired by all, but scarcely done justice to in the matter of cultivation. Our bearded Lady's Slipper (Cypripedium barbatum), found in considerable quantities in Java, is another very excellent species in general cultivation. Even our older species, longer known in this country, are not by any means eclipsed by the more recent novelties. Both C. insigne and C. venustum, introduced from Nepal, are highly ornamental species, and better fitted for standing the fatigue of a drawing-room or parlour climate than many plants which are recognized favourites. Cypripedium villosum, from Moulmein, is a species which took the market very readily. When the flower becomes fully developed, it seems as if it had been coated with varnish, so shining and polished like, and artificial, does it appear. With C. barbatum on the one hand, and C. villosum on the other, there seemed to be, in Mr Dominy's eyes, a complete field for hybridization. Successful beyond his compeers in the crossing of Orchid plants, and the rearing of Orchid seedlings, no one was likely to be better able to accomplish the task. It was not without many trials and failures that our hybridist at last succeeded in effecting his purpose, and Cypripedium Harrisianum is one of the most distinguished of the progeny. The stock is wholly in the hands of Messrs Veitch, to whom we are again indebted for this and the accompanying engravings.

We append Messrs Veitch's condensed notice of Professor Reichenbach's diagnosis published in the *Gardener's Chronicle*:—

"The leaves are narrower than those of

barbatum, but broader than those of C. villosum, spotted as in C. barbatum, and glossy ıe C. villosum. The peduncle is quite that of llosum. The bract is green and violet, but tinct are confluent, so that the greater part of it appears of a blackish purple, whitish near the top. It is very glossy. The inferior sepal is whitish green, and not glossy. The

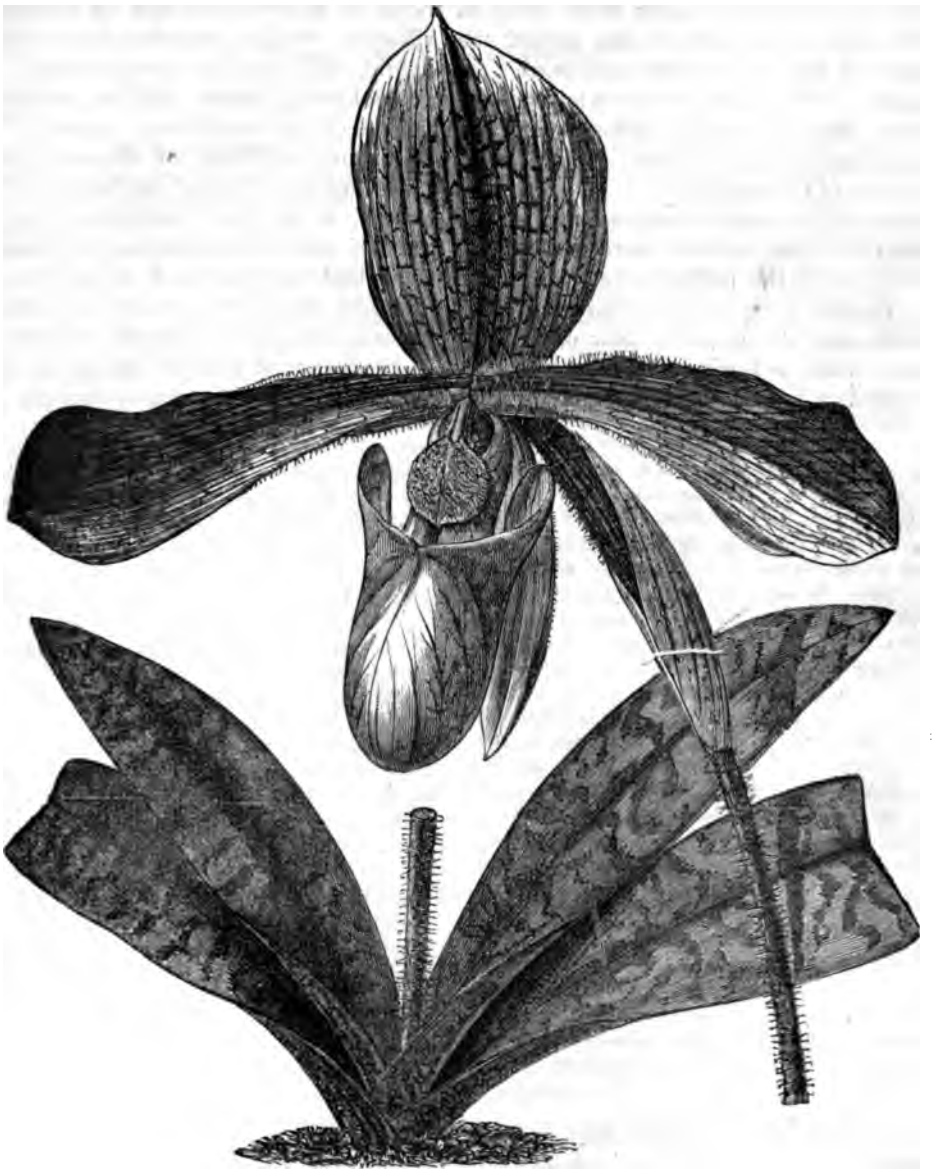


Fig. 3.—Cypripedium Harrisianum.

ıving less hairs than that of C. villosum. he upper sepal comes nearer C. barbatum, ıt is covered with a denser pubescence. he dark violet streaks in lieu of being dis- petals are spread at a right angle, and are ligulate ovate acute, hairy on the upper and under limb, as in C. barbatum, narrower than in C. villosum, very shining port wine

coloured, with a very dark line on the middle nerves, which are green beneath and dark atro-violaceous above. The lip is of a light port wine colour, with a tinge of light green here and there; it has dark brown spots on both sides of the limb, bristles around the mouth of the sac, and fine dark bristles internally. The colours are much brighter and darker than those of C. villosum, and the flowers are as large as those of the largest varieties of C. barbatum."

In addition to the above, we may remark that the foliage partakes more of the seed-bearing than the pollen-bearing parent. It is even more beautiful than C. barbatum, being larger, and the ground colour of a darker green, while the barring or spotting is quite as decided as in the best examples of the seed-bearing parent. The engraving gives but a faint idea of the health and exuberance of a plant in a good state of growth. The flower comes away in a hairy peduncle, and is richer in every respect than the beautiful C. villosum. We have, therefore, here a distinct hybrid, with the fine glossy flowers of its pollen-bearing parent and the ornamental foliage of its seed-bearing parent. There seems an interfusion of character that is most singular to behold, and what, to horticulture, is of great importance, the good parts of each of the species perpetuated in the hybrid here engraved, fig. 3. We congratulate Mr Dominy upon his wonderful success, creditable to himself, and likely to be productive of good to the science, in setting to work new labourers in the field.

Work in the Garden during June.

From "THE VILLA GARDENER."

THE VINERY.

ABOUT a fortnight or three weeks after the Grapes are set, proceed to thin both bunches and berries. I think I recommended that only one bunch should be left on each shoot. But this, in many cases, would prove a killing crop. The fact is, Vines vary wonderfully in the number of eyes, and, consequently, shoots, in a given space. Sometimes the joints, as they are called, that is, the internodes or spaces between the buds or side shoots, are long, sometimes short. I have seen Vine-rods studded with buds, at about 2 inches asunder, and other lanky fellows with intervals of 18 inches between each bud, or pair of buds. Of course, if all the bunches were left on the short jointed wood, that rod would carry nine times the number as its lanky neighbour. Such great extremes are seldom met with, but from 4 to 12 inches is no unusual range. Where the shoots are 6 inches apart, every other bunch may generally be removed with advantage. Of course, much depends on the size of the bunch, the age and condition of the Vine. But more evil is wrought by overcropping than aught else, and the enthusiasm of villa gardeners is very apt to lead them astray in such matters. One good bunch is better than two small or puny ones, and a moderate crop every year greatly to be preferred to a sensation one followed by a hiatus. Then, again, as to thinning of berries, don't over-do it. About three may safely be removed to one left, if the Grapes have set closely, as Black Hamburgs mostly do. But it is better to go over the bunches a second time before they take the second swelling, than remove too many at the first thinning. Perhaps it may be well to add a word of explanation concerning the phrase second swelling. After Grapes are fairly set, they rush off and swell out with great rapidity. When they reach about half size, they suddenly stop and make no visible progress. This stoppage has been a terrible thorn in the side of many amateurs. They try every means to make the Grapes move on, but they won't. Interference stimulants are dangerous at this stage. The Grapes are busy stoning, and have learnt the great art of successful working—one thing done well at one time. This accomplished, they start afresh, and stop no more till they are fully ripened. It is easy to judge, at any time during this six weeks' interregnum of growth, whether the half-grown Grapes will have room to become full grown. If so, let well alone. If not, carefully remove as many berries as you think will leave sufficient space for the others to reach full size. As to the mode of thinning, cut a small forked stick about the length of a penholder, and the forks ¼ of an inch in length, smooth and pointed. Steady and turn the bunch slightly with this, and ply a pair of sharp-pointed, clear, bright scissors (see page 88), with the other hand. Never cut a berry, however small, only the tiny foot stalks of the berry, and keep the scissors dry and clean. Touch not the bunch with hand, head, or sleeve. Be as gentle in your manipulations as if you were nursing a sick child, too weak and delicate to bear your supporting touch. Finally, don't even breathe upon the berries, least your breath rust their tender skins.

As you thin, remove all useless leaves and young growths. But be careful in doing so not to expose the bunch to the direct rays of the sun. Nature never intended the shoulders of the bunch to bear the midday sun's broad glare. The fruit of the Grape will not bear the sun on its unsheltered top, any more than civilized man can endure it on his uncovered head. Sunstroke results in both cases alike, though it seldom affects the sides of the bunches. But too many leaves should never be removed at one time or at all, as the leaf is the strength of the Vine, and its shade is beneficial to the fruit. It is a good rule to have one leaf for every joint made beyond the bunch, until the space is pretty well occupied, not crowded with foliage. In a well regulated Vinery, the sunlight plays, as it were, hide-and-seek among the bunches, and only pierces through the vernal screen in lines and patches.

Keep up the temperature to 65-75 deg. while the Grapes are swelling. A moist, genial atmosphere must prevail; and in giving a change of air, avoid draughts. Many Grape growers make sure of escaping the latter by giving no front air at all until the fruit begins to colour. Without a through current, there can hardly be a draught.

THE ORCHARD HOUSE.

The sun will exert his full force this month, trying tender fruit and young leaves to the utmost, and doing his best to drain the plants dry of nourishing sap. We must meet and master his power with the watering pot. Trees in pots, swelling their fruit, may now need a soaking through twice a-day. The earth must never be allowed to become very dry. If the flow of sap is once arrested, the fruit may drop in consequence.

This is especially true of stone fruits, such as Peaches, Nectarines, Plums, Cherries, the last being the most sensitive of all, probably, until the stoning is completed. The opposite extreme is almost equally fatal. Gorge the young fruits with water, and they are carried away by the flood. A happy mean must, if possible, be struck between the two. Planted out trees are easier managed, and it is seldom they will need to be watered oftener than once a-week. It is much better for all fruit trees to be surface-mulched. This reduces the labour of watering to a minimum, and lessens the risk of washing the goodness out of the soil by incessant rinsings. Where the surface of borders or pots are thus rendered, to a great extent, drought-proof, it may be necessary to heavily syringe the surface of the mulching twice a-day. The June-dried air will thus have its thirst quenched by drinking up the surface water.

Some of the trees, such as Cherries, Apples, Pears, and Plums, are occasionally removed to the open air this month. This makes more room for the trees left, and gives a longer succession of fruit. If, say, half are now taken out, these will succeed those left under glass, and will keep up the supply till the earliest varieties ripen in the open air.

Swarms of insects come with fine weather. Conquer the fly with fumigation, and fight red spider with the syringe, engine, or rose watering-pot. Water is a better panacea then sulphur. But it often takes both to subdue this pest. Discharge both barrels at them thus:—Drench the leaves and branches with water, and then, with a puff box or wool duster, dredge them all over with golden sulphur, as a miller is covered with flour, or a sweep with soot. The sulphur either kills the spider or makes it flit to cleaner, sweeter quarters. Within heated houses, the most effective way of applying sulphur is to diffuse it in fumes from the surface of hot-water pipes. But this is impracticable and dangerous in orchard houses in June.

This is the month to move pot plants, to prevent their roots going through the bottom of the pots. I consider this rather risky practice. If done at all, make sure that the fruit are stoned first, and see that the plants have special care during this rough-and-ready mode of disrooting. If done during bright weather, shade for a few hours for that and the following week; give the leaves another sprinkling or two of water, and keep the air unusually moist. This will give the plant time and opportunity to recover from its sudden and severe deprivation of roots. It is safer to leave the roots to go where they may till the fruit is ripe. Then move the pots to break the roots and forward the maturity of the wood. Proceed with pinching, &c., as recommended last month.

It is impossible to give too much air in June. Open top and bottom ventilators and sashes, unless you wish to hurry the fruit, leave them open night and day. It cannot be too cold for the well-doing of the trees in orchard houses in June. Thin the fruit so that they do not overcrowd, nor squeeze against each other. If the crop is heavy, the trees might be helped with a rich top-dressing, and after they are fairly stoned or established, every alternate watering ought to be of sewage or liquid manure. If it be desired to hasten the fruit forward, shut up the house about 4 P.M., and keep it close and warm till 6 A.M., but see that it has air, reaching a maximum of ventilation by 10 A.M.

THE GLASS HOUSE.

Train climbers on the roof and prevent their getting entangled. Two of the very best climbers are Lapageria rosea, and Mandevillea suaveolens. The latter one of the two is easiest to grow, and the former somewhat capricious in places. But when it gets away, it does well. It succeeds best in rough peat, and can hardly be over-watered when in full growth. The Tacsonia Von Volxemii and Kennedya Marryatae are two more very handsome climbers. The great secret of success with most greenhouse climbers, is a good root run and freedom of top growth, without entanglement, that is, long sprays hanging gracefully down, not bundles of inextricable confusion. See that insects do not infest these roof plants. If allowed to get a footing among them, they precipitate themselves broadcast over the glass house and all that is in it. From their high vantage ground, they dominate the whole structure. Clean water, on the heels of dense clouds of tobacco smoke, are the chief remedies. Don't syringe before, but after smoking. The old plan was to do both; but it was found that the insects enwrapped themselves in water globules, and looked through to our supposed death-dealing fumes with impunity. Water is partially, at least, impervious to smoke, and hence their safety.

The glass house is generally thoroughly overhauled this month. Many of the plants wintered in it may be placed out of doors from June to October—Cytisuses, Coronillas, Epacrises, common Heaths, Camellias—as soon as their buds are formed, and old-established plants of Azaleas, being amongst those that are generally summered in the the open air. Younger plants of Azaleas, Camellias, choice Heaths, and Chorozemas, should be shifted and kept in the warmest, closest part of the house, to encourage new roots and fresh growth. Most hard-wooded plants, especially Camellias, are benefited by shading when growing freely. All the room that can be made by the removal of hard-wooded plants into the open, and the fading of such things as Cinerarias, Calceolarias, Primulas, Pinks, &c., will be needed for Pelargoniums, Fuchsias, Ferns, the hardier Palms, &c. Many fill their glass house now-a-days with Pelargoniums alone, and a glorious display they make. Some, again, discard two or three classes of these, and grow only Zonals and variegated or bronze varieties; but the old show or fancy Pelargoniums will, I trust, long find a place in the glass house and windows of villas. They are exquisitely beautiful in leaf and flower, and, when well done, equal, if they do not even excel Azaleas. These old sorts are in full

rom June to August. They should be kept partially shaded, and liberally watered with : or manure. Standen's manure is very useful their last stage. After they are studded with buds, it is almost impossible to over-feed them. g now received their last attention in the way ning, it is only needful to arrange and enjoy

Fancy Pelargoniums cannot assimilate so food as the grosser growing show or French va- They are altogether more delicate, and must be . with greater care. They are the lady class of oniums, smaller, more tender, and beautiful ıe others. They can hardly have too much air. over-crowding, and keep out and off the bees. arnish, rend, and ruin the larger flowers, but rush the fancy sorts to atoms beneath their ıg weight.

ıl, Variegated, and other Pelargoniums.—These not occupy the glass house at the same time as ıers. Comparisons are odious, it is said. And s the saying more true than when comparisons ıallenged between different classes of Pelar- ıs. Let each come in its season, and each will ıly be admired in its day of beauty as best; ng them together, and it is different. Therehen the show and fancy sorts are in their glory, e the others to a sunny spot in the open air, or ld pit or frame. There they may be stopped and l at leisure, and be treated so as to flower in suc- ı up to Christmas. I observe that a correspon- sks, at page 92, "How to Propagate Fancy oniums," and you give him a very good answer. ıu advise him to wait till July. But I find it a ɔlan to propagate fancy Pelargoniums at any hen you can get good cuttings. In training spring, it is often desirable to thin the shoots. if put in at once in a warm pit or close house, ıickly, and will be strong well-rooted plants by l of May. They may be then planted out on a t of light ground fully exposed to the sun; the stopped every month or six weeks, prevented lowering, and potted up early in September. will be such plants as can hardly be produced ɔther treatment, and mostly flower and grow with ıg strength the succeeding season. The main ıf cuttings, however, are seldom put in till July, say. But these accidental snatchings succeed :h better, that we seldom strike many Fancies at :riod. Finally, these Fancies, like their fair re- :atives, are fickle and frail. They have a most ing habit of dying suddenly without apparent and therefore, we can never scarcely have too ɔf them.

ısias.—Give a final shift, stop, and train. Water showy flowers with stimulants. Keep the clean, and the plants healthy, by syringing :-day, and beware of over-crowding. Ferns, plants in hanging baskets, Lycopodiums, &c., copiously, repot if they require it. Late herbaceous Calceolarias, shade from the sun, keep free from insects, water copiously, ripen, gather, and sow seed.

PITS AND FRAMES.

Hot Pits.—Those occupied by sub-tropical plants and tender plants for the open air, will now be available for other purposes, such as the growth of Balsams, Cockscombs, Caladiums, Gloxinias, Gesneras, Begonias, Celosias, young Fuchsias, &c. For all these purposes, a surface heat of 70 deg., and a bottom heat of 80 deg., will prove best.

Fresh crops of Cucumbers and Melons may likewise be planted. Success is much more easy and certain now. Many amateurs buy the longest Cucumbers at this season. They may try Blue Gown and Hamilton's Invincible; and for any who are very ambitious, the new China sort sent out by Mr Veitch, which may be grown 4 or 6 feet long. I can add, from experience, that it is a free grower and good fruiter, and that the flowers are prodigious, and the fruit of the most perfect form, no shoulder, and almost white with bloom. Next month I shall report progress concerning this novelty, which is named Sooly Qua. Older Cucumber plants, water about once a-week, and shut up about 4 P.M. daily. Stop the growing shoots at each leaf made; leave only the best and straightest fruit to swell; and beware of over-cropping and over-crowding the leaves.

Melons.—Note and act upon the concluding advice about Cucumbers. The chief art in growing Melons is to stop the plants at the third or fourth leaves; then allow two or three shoots from each plant to reach the side of the pit or frame. Pick the points out of these leaders. Lateral or side shoots will break from them. These will speedily shew male and female blossoms in abundance. When about six good fruits shew on a plant, set them all on the same day. If they swell off together, a crop is ensured, that is, if common care in watering, airing, covering, &c., is given afterwards. Melons need less water than Cucumbers. During the growing period, the treatment may be similar. I will describe the ripening process next month. Melons may still be sown, and a good autumn crop ripened, but there is no time to lose.

Cold Pits.—As Potatoes, Radishes, Early Carrots, &c., are cleared off, and Auriculas, &c., placed in shady places out of doors, and Pinks, Pansies, &c., planted out, these will be mostly occupied with cuttings, seedlings, or young plants. Chrysanthemums are likewise frequently grown in these structures during their early stages, as are Salvia splendens, S. gesneriflora, and other winter flowering plants. Shift Chinese Primroses and Cinerarias. Sow Auriculas, Polyanthuses, Pansies, and herbaceous Calceolarias, and prick off the young plants.

Strike cuttings of choice Pelargoniums, and grow the late Zonals for autumn flowering. Cuttings of Hollyhocks, perpetual Stocks, double Wallflowers,

Rockets, Phloxes, Pentstemons, should likewise be dibbled in. These cuttings can generally be procured when such things are tied up for flowering. It is good practice to thin the stools slightly, using the overcrowded shoots for cuttings.

THE FLOWER GARDEN.

Unless very thickly planted, or cropped after the mixed style, is apt to look somewhat raw in June. The plants take time to become acquainted with their new quarters, and longer still to fill them. See that all that need it are securely staked. With Dahlias and all such plants, the stake should be planted first. The plant is then inserted by its side, and tied to it at once. The roots thus escape the risk of being stabbed, and the tops of being bruised or broken before they can be tied. All staking of herbaceous plants should likewise be completed at once. Early staking is easiest. If early flowering bulbs are fixtures in the flower garden, a compromise must be made between tidiness for the present, and beauty next spring. Present tidiness demands the removal of every dead or dying leaf. Next spring's floral display pleads that they be kept a little longer, to die first. A balance will have to be struck between them. But remember, as you hold the scales, that for every miniature leaf cut off, you sacrifice somewhat of the number, size, and beauty of next spring's flowers. If June weather prove fiercely hot, as it does sometimes, the flower garden will be benefited by a weekly flooding of water. Turn it over in the evening, if possible, that the plants may drink, and be satisfied at their leisure. During the bright shining of the sun, water is of little use to the plants. Evaporation chills almost more than the water refreshes, and it is doubtful if the evils of day watering, during sunshine, does not overpower the good.

Peg down and train any plants that require so doing. Thin spring-sown annuals. Propagate by division such spring flowers as Forget-me-nots, Arabises, Violets, Venus Navel-wort, &c. Hoe, rake, clean, sweep, trim, top-dress, roll gravel, and mow grass every week at least, and let everything in and about the garden be without spot.

THE FRUIT GARDEN.

Finish disbudding and the pinching off all crowded shoots, and tie or nail in those that may be needed to fill up any vacant space. Allow considerable vacant space between the shoot and such ties or shreds, to allow of the free swelling of the same. Few things are more destructive to fruit trees than the cutting pressure of tight ties. They interrupt the flow of the sap, and are the fruitful cause of canker, gum, and other diseases. The ties of grafts that have taken should likewise be examined, and if the graft is growing freely, a fresh tie should be given. The clay or grafting wax may likewise be removed. All shoots beneath the scion should be taken off the stock, and the scion carefully tied to a stick made fast to the stock, and proceeding upwards beyond the head of the scion. This prevents the latter from being blown off by winds. Trees planted last year may need all the help that artificial watering at root and top can give them, should the weather prove dry, to enable them to carry through a crop of fruit.

Green-fly must be kept down by frequent doses of tobacco water, Gishurst's Compound, or Quassia chip teas. This pest should be attacked as soon as seen. It is difficult to eradicate after it has made much progress, and is most destructive on the young and tender shoots.

Apricots, Peaches, Nectarines. — Thin the fruit where it has set in thick clusters, which are not very common this season. The frost in April has proved very destructive in many localities, thinning the blossoms almost to barrenness, and damaging the young wood with frost bites to a most destructive extent. The worst of all such frosted branches must be cut out, and freely laid in to supply their place.

Young Wood Vines out of doors.—Tie the leading shoots. Stop the side shoots, one leaf beyond the branch, remove weak, useless branches.

Apples and Pears.—Remove or stop back the young wood to about four leaves of their base towards the end of the month.

Strawberries.—Water and mulch with clean litter, or cover the surface with patent or common tiles to keep the fruit clean. Protect these and early Cherries from birds.

THE KITCHEN GARDEN.

During the sweltering weather we often have in June, kitchen gardening is apt to be neglected; but the only way to be always reaping, is to be continually sowing or planting. The modern art of perfect kitchen gardening is perpetual cultural motion, as near as may be. If you want to rest the land, give it a change of crop. To gather bountifully through the autumnal and winter months, a good deal of work must be done in June. Plant Cauliflower, Brocoli, Brussels Sprouts, Borecole, Leeks, Celery, Vegetable Marrows, Ridge Cucumbers, Tomatoes, Capsicums, Lettuces, Broad Beans, and French Beans. Sow Peas, Cauliflower, Walcheren, and White Cape, Brocoli, Spinach, Turnips, Celery, Mustard Cress, Radishes, and Onions, for drawing young.

Potatoes.—Hoe deeply, earth up into a wide ridge. Clear off early Peas and Potatoes as soon as possible. Manure liberally, dig deeply, and furnish at once with Cauliflower, Brocoli, Spinach, Celery, or Lettuce.

Onions.—Hoe, and then top-dress with a sprinkling of soot or guano, as an antidote to slugs and a stimulus to the plants. Keep the hoe going to enrich the surface as well as to kill the weeds, and let every part of the kitchen garden be kept well ordered, thoroughly furnished, and scrupulously clean. So shall the eye of taste, and the taste of the dainty, be alike satisfied.

The Veterinarian.

*ANIMAL PLAGUES: HISTORY, NATURE, AND PREVENTION.**

IN the volume before us we are presented with information of the most valuable nature, gathered from every reliable source, which cannot fail to enrich our present but meagre stores of knowledge on the plagues of animals, and throw a gleam of light on the collateral pestilences of mankind. Hitherto, we have contented ourselves in believing that patient, silent working on materials of our own creation or arrangement would answer the ends; while the powerful speaking records of past generations, pregnant with vast experience, have been unsearched and altogether ignored. There is no other department of social economy that cannot turn to a history of the past, and point to innumerable pages having upon them written, in unmistakable characters, the matter out of which useful experience has been gained; yet in the care of our domestic animals, and maintenance in them of a colossal wealth, history has gone for nothing. The ignorance of the benighted waggoner who sat down and prayed to Hercules, rather than put his shoulder to the wheel, is a counterpart story of the blindness and stupidity of recent generations, who supplicate for a removal of pestilence when the poison germs lie around them in thick profusion, as a result of their own recklessness and idleness. It is much easier to argue in a strain suited to selfish ends, and decide in the way verdicts are more agreeable to our will, than to search for the truth as it lies deep in the records of bygone ages. This has been eminently the case with veterinary science. Few authors have dared to cull from antient works, and many more, with assumed professional dignity, but possessing no ability to plunge into the mysteries concealed beneath other tongues, have preferred to be content with their own ideas, however incorrectly balanced, and mislead the public by them, rather than give way before the weight of truth, and sacrifice the revenue derived under a reign of ignorance.

In the author of "Animal Plagues" we recognize the elements of stern determination in the search after this truth, and in the volume which he has given to the world there is a rich legacy of information available to the statesman, comparative pathologist, veterinary surgeon, and general agriculturist. The welfare of our unparalleled flocks and herds is a subject of national importance. Any cause by which they are decimated exerts itself ultimately upon the whole community, and trade and commerce stand paralyzed before it, while fever and pestilence often seize the human population as a result of the withdrawal of necessary animal food.

Besides, the plagues of animals are ruled and guided by causes which certify and order the pestilences upon mankind. Previous ages have demonstrated all this, and it has been the mission of every one to record their history in most unmistakable, although they may be said to be singular ways. Whatever we may urge against the superstitious observances of heathen nations, their orgies, and imbecile petitions for the setting aside of pestilence, while sanitary laws have been totally disregarded, we cannot deny their value in marking, by characters indelible on the face of history, evidences of the ravages of disease, without which they would not have been handed to us in the manner

* "Animal Plagues: History, Nature, and Prevention." By George Fleming, F.R.G.S., &c. London: Chapman & Hall.

now notice. As we scan page after page, and suffer ourselves to be drawn insensibly into the train of interesting details, we cannot avoid offering mental tribute to the author for the abundance of fact he gives us in a form at once the most readable and instructive; and in comparing the sad havoc which fell disease has at various times caused in our valuable stock. With the evidences of the work before us, we are led to the conclusion that the few who, in the crisis of 1865, went to the front, and proclaimed salvation in prevention, and "poison in the cup," were alone right. If a blundering legislation and an unwilling and ignorant community had possessed the correct facts of history which Mr Fleming has drawn from hitherto unnoticed sources, this country had been saved a loss of many millions since the time we have named, with succeeding famine and visitation of malignant and human fever, the British farmer having greater peace of mind, with undiminished pride in his success as a breeder of stock, and ourselves at this period been less dependent upon foreign countries for the flesh of their pest-ridden animals. The book cannot fail to be a complete success; the subject it embraces is of national importance, and as a work of reference to the law-maker, physician, and student of medical science, as well as to the veterinary surgeon, it will be found invaluable.

PLEURO-PNEUMONIA.

BY this compound term is implied disease affecting two unlike, but important, tissues or structures of the respiratory organs. Pleurisy, or inflammation of the pleura—the lining membrane of the chest (thorax), and pneumonia—inflammation of the substance of the lungs—are associated, and, running a parallel course, destroy life by interference with vital functions by the obliteration or change of organic structures.

This disease is most commonly known in connexion with animals of the bovine species —cattle, cows in milk being largely affected, and from its continued prevalence this country suffers in a surprising degree every year.

From the tone of general remarks made with reference to pleuro-pneumonia it is evident much misconception arises, and this leads to a false belief in the institution and efficacy of certain spurious as well as genuine remedies. It is not generally nor sufficiently known, that *two* totally distinct forms of pleuro-pneumonia in cattle are met with; these are characterized by signs exactly identical to ordinary persons, that no wonder need exist at their being confounded with each other. The first form is of an acute or active character. The disease runs its course in a few days, and at the end of three weeks the animal is convalescent. For the consolation of the farmer, we may also add that it rarely proves fatal, is peculiarly susceptible to proper medical treatment, seldom affects more than one, two, or three out of the same herd, and is *not* communicated to others by infection or contagion.

Of the other form, we have to speak differently. It is unmistakably contagious, and rarely appears in a herd without affecting the whole. It is extremely fatal, but animals recovering from its effects are rarely or never attacked a second time; in the first form, plurality of attacks are common. The principal cause of death is internal drowning, the result of large accumulations of water within the chest, which interferes with respiration and circulation.

Of late we have heard many contradictory reports anent these distinct affections, which are raised to prove the curability, as well as non-contagious nature of the second form, admitted under the general term, and confounded with the first, or simple and acute form. This indicates defective observation

leads those who embrace such tenets.
: of cures of startling magnitude, and
s are puffed into existence and repute,
epend for their vitality upon the easy
: those who purchase them. Let our
feel assured that when pleuro-pneu-
isappears after such adoption of "hit-
' remedies, the animal has been suf-
om the simple form, and that nature's
if left alone, would have been quite
t for the purpose of recovery. When
nic, protracted, and contagious form
herd, there is nothing but an early
out, and a well directed system of prevention that will prove of service. We advise our readers to fortify themselves with special information on these diseases, and refer them to the Report on Pleuro-pneumonia published in the *Transactions* of the Highland and Agricultural Society, fourth series, No. 5, for 1870. The subject has also been treated at greater length at pp. 143 and 247 of Warne's edition of "Clater's Cattle Doctor." At this time, when Britain suffers from foreign scourges among her unsurpassed herds, it is necessary to be provided with information that will serve to distinguish the imported from native diseases.

DISEASES IN LAMBS.

ORRESPONDENT writes us as follows :—

hall be very glad to know if any
: correspondents can explain the
and suggest a remedy for a disease
ffects young lambs, and from which
derable number die. It is known
ame of 'staggers,' and it frequently
; that ewes having twin lambs, the
l be quite strong when born, the
often the finer one) so affected as not
ble to stand, and from which it never
;.

ie breeds of sheep are not subject to
ase, while others are, although grazing
ame field. In my own case, I have
:r of Shropshire Down ewes grazing
same land as the half-bred ewes, the
never have 'staggered' lambs, the
n the latter is considerable.

: tups employed were selected, in the
:ase, at Shrewsbury; in the latter, at
ll young fine sheep."

ffection our correspondent describes
n as hydro-rachitis, or the louping-ill
shepherds, as well as "staggers" in
stricts. It is purely a nervous malady,
ng upon some lesion of the spinal cord generally. Lambs are mostly affected, and, as our correspondent remarks, in a flock composed of two breeds, the lambs of one set of ewes are exempt, while the others are entirely free to grow to maturity. We have known the malady to exist on farms to such an extent as to starve out almost the tenant, and in the following years it is not seen; but after the lapse probably of half-a-dozen seasons, it re-appeared with its former severity.

Remedial treatment is productive of little or no good.

Preventive measures, which must be based upon a complete knowledge of the causes and all the circumstances, *e. g.*, locality, soil, vegetation, with many other conditions that are intimately associated, are not always very clearly indicated. Very much more must be investigated before the agricultural world can be enlightened on the matter. It is, however, obvious that when certain breeds of sheep (ewes) that are known to thrive less on a certain track of land than others, they should be removed, or supplied with more nutritious elements. Assimilation is not alike in all animals—even of the same species, and these facts should stimulate observation for the public welfare.

The Dairy and Poultry-Yard.

SEASONABLE TREATMENT OF COWS.

COWS must have good food and water, and plenty of it, from the time they calve till the grass becomes abundant. A cow always is in her flush of milk just after calving, and if she is then stinted or neglected, and so falls off in her yield of milk, it cannot easily be again restored. Many a good milker becomes unprofitable, through the summer, from this cause, and it is well not to have cows come in earlier than the middle of May, unless the farmer or dairyman has a full supply of such food for them as will keep up the flow of milk until grass comes in.

Besides hay, they should get roots, which should invariably be fed just after milking in the morning and evening, giving none at noon or any other time, if it is desired to avoid having an unpalatable taste imparted to the milk or butter. If roots cannot be had, chop the hay fine, steam or boil it, and add meal, either of corn, wheat, or peas. Where butter-making is the object, only such cows should be kept as give rich milk, rather than an unusual quantity of it; while, for cheese-making, or supplying city milk, quantity rather than quality is the desideratum.

Cows should not only be milked with perfect regularity as regards the hours of milking, but they should be milked to the last drops; and if hired girls or men are employed to milk the cows, the dairymen, farmer's wife, or whoever has charge of the dairy, should go round with a small tin pail, and milk each cow dry before the work is to be considered complete, and they are allowed to return to the field or enclosure.

The udders should be washed with tepid water before milking, so long as the cows remain in or about the yards, but after they are put on pasturage, it will seldom be found necessary to do more than wash the teats occasionally. The habit acquired by many servant girls of dipping their hands in the milk while milking, is a disgusting practice that should not be tolerated. Cows are just as easily milked with dry hands, and if they are not, the teats should be softened with tepid water, and great care taken to allow nothing to drop from them, or the hands, into the milk-pail while the operation of milking is going on.

Many diseases of irregularities of the bag, the teats, and the milk, are popularly called among farmers, "garget." For the most common of these, such as swelling, caking of the milk, small lumps in the teats, causing great pain in milking, inflammation of the bag and similar troubles, there is a simple and specific remedy, which has been successful in many cases. One ounce of hydriodate of potassium dissolved in 1 pint of soft water. Dose for a full-grown cow—one large spoonful mixed with a little bran mash, twice or three times a-day, according to the virulence of the disease. It should be used with caution, as it has a tendency to dry up the milk.

We believe too little attention is paid to the matter of raising cows for the butter dairy. Perhaps no one particular breed is better than another for the dairy, as cows giving rich milk may be found among all breeds, as well as among our native stock and crosses upon it, but by proper management, a good development of milking qualities may be established and perpetuated in a herd of dairy cows.

The necessity of cleanliness in every department of butter-making cannot be too often urged. The want of it is the cause of

e a proportion of inferior butter being
it to market; and, to such an extent
lessness shewn in this respect by many
n the better class of farmer's wives,
ren when good butter is in market, it
ot command an extra price, unless the seller has an established reputation for furnishing an article of perfect purity. The wealthier classes are getting to be very dainty in regard to the butter they consume, and pay very high prices for an article they know to be good.

AMERICAN BUTTER FACTORIES.

By X. A. WILLARD, A.M., of Herkimer, New York.

HE American system of associated dairies was inaugurated during the part of 1851. Though twenty years have ed since the plan was conceived, the ng features of the system remain unged. Great improvements, it is true, been made in buildings and dairy appa-, and in the methods of manipulating for cheese and butter manufacture; still, ganizing factories, in the manner of deli-g milk, in the relation between manurer and patron, in the care and disposal ie product—indeed, in all the general nes of the system—it is the same to-day ien Jesse Williams, in 1850, mapped it for the first cheese-factory, which he ed early the following year. After nine-years' experience in associated dairying, ig which time the system has been put to severest tests, the American dairyman it more economical as regards labour, lings, dairy machinery, and appliances; e the factory product on an average will for enough more than that made in the vidual farm-dairy to pay the entire cost of ing. Another important result of the em has been a constant improvement airy management, and the better knowe of all that pertains to milk and its pros, than would naturally obtain under the system. It has established a special proion or calling, upon which men enter with ew of making it a sole business. They, refore, seek to perfect themselves in it, and as skill and success are sure to be properly rewarded in this department of labour, great emulation exists among manufacturers to excel in their art. During the first ten years of the factory system it received much opposition, especially from those who had only a superficial knowledge of its operations. So strong was this opposition among the old dairymen, that it was pretty generally believed that the system could not long endure, and it was confidently predicted that the factories would be abandoned, and those engaged in them would return to the old plan of individual or farm-dairying. But the factories, meanwhile, were steadily gaining ground; and dairymen entering upon the new system found in it so much relief, as well as profit, that they could not be induced to abandon it; and so to-day associated dairying in America has come to be regarded as a fixed institution. In the original plan of Mr Williams it was not contemplated to apply the system to butter manufacture. But the success of the cheese-factories suggested to the butter dairymen of Orange County, New York, such a modification of the system as would adapt it to their branch of business.

FOOD OF STOCK: DAIRY BREEDS.

Before entering upon the question of butter manufacture and factory ma t, it will be proper to say a word c cer the food of stock. The excellence of "butter" does not depend altogether on its nu-

facture, for, in the first place, good milk must be secured. "Fancy butter," that will sell for 1 dollar per lb. cannot be made from bad material, from milk produced on weedy pastures, or upon the rank sour herbage of swamps, or upon land newly seeded with red clover. The experienced butter dairymen, therefore, pay much attention to the feed of their cows, and prefer old pastures. On the old pastures of the butter district there are several varieties of grasses that spring up spontaneously, and are much esteemed as affording sweet and nutritious feed, from which the best qualities of milk and butter are produced.

It is claimed by some that the flavour and texture of butter are influenced by the breed of cows. Butter from the milk of Breton and Jersey cows is said to be not only more solid and waxy in texture, but to have a finer aroma than that produced from other breeds. The milk of the Jersey or Alderney cow is exceedingly rich in cream, and has a deep yellow colour, as is well known. But this question need not be discussed here. It will suffice to state that among the butter dairymen of New York but little attention is paid to breeding, and no prominence is given to any particular breed. The herds are usually made up of "the common cow of the country and grade cattle." There is a sprinkling of grade Shorthorns, Ayrshires, Devons, and Alderneys, and occasionally a dash of Holstein blood, obtained by crossing throughbreds upon the mongrel or common cows of the country. But, as we have remarked, reliance for the most part is had upon the so-called native or common cow of the country for making up the herds. It is proper that these facts in regard to pastures and stock should be stated, in order that correct conclusions may be drawn, in making up an opinion of what we shall have to say about butter factories, and the character of product they are able to make. As to the size of herds kept on the farms, they are usually smaller than those in the cheese-dairying districts. The herds on an average, we should say, will number about 25 cows to the farm. Some farmers, it is true, carry from 40 to 60 cows, but in the majority of cases the herds are small, ranging from 15 to 30 cows.

PLAN OF ORGANIZATION.

The plan of organizing factories is somewhat similar to that employed in the cheese districts. The first effort of organization in a neighbourhood generally falls upon one or two persons, who may be desirous of having a factory where they can deliver the milk from their cows, and have it manufactured. They, perhaps, have examined the workings of some factory, and have become convinced that greater profits are to be realized from the factory-system than from the farm dairy, besides relieving the wife and daughter from the drudgery attendant upon making butter at home. They therefore endeavour to bring their neighbours to the same opinion, and to induce them to join in erecting the proper buildings, &c. They go about and talk with their neighbours, and finally call a meeting at some central point in the neighbourhood, when all are invited to come and discuss the advantages and disadvantages of the system. The cost of erecting a good factory, and supplying it with machinery and dairy appliances, is not far from 4000 dollars (£800), and the farmers of the neighbourhood are expected to join together and pay for the erection of the buildings, in proportion to the size of their farms, or number of cows from which milk is to be delivered. The shares are put at from 10 dollars to 12.50 dollars each (£2 to £2 10s.), so as to be within the reach of farmers who have but few cows. After the stock shall have been subscribed, a meeting is called, officers are chosen, and powers are delegated for the erection of the building and for putting it in operation. The structure being completed and furnished, a superintendent is chosen, and help hired for running the factory; and the expenses are shared by the stockholders in proportion to the amount of milk delivered. The cost of repairs, additions, &c., from year to year, is added to the expense account. At some of the factories having the milk of 400 cows, the expense account for labour has amounted only

to a fraction above two mills per quart of the milk delivered, and the gross proceeds from sales gave to farmers above 5½ cents per quart (11d. per gallon), wine measure.

THE BUTTER FACTORY.

The first American butter factory was erected by Mr Alanson Slaughter, of Orange County, New York. The main building is a cheap two-storeyed structure, arranged on a plan similar to that of the cheese factories. On the ground-floor are the milk vats, presses, and other appliances for making cheese, while the second-floor is entirely devoted to the dry-room or department for storing the cheese during the process of curing, &c. The spring house is built out upon the end of this structure, forming a wing, and is one storey high. It is divided into two rooms, one 12 feet by 16 feet, and the other 14 feet by 24 feet. The packing and churning room is in a separate building, 12 feet by 24 feet, and stands opposite the spring room, with a narrow alley between. This alley is used for a horse-walk, where the teams deliver milk and cart away the products of the dairy. Connected with the packing and churning department, there is a horse-gear for churning, and an ice-house and store-room. This factory is intended to take the milk of 400 cows. The churning at the large establishments is done by horse-power. There are a variety of powers; but that most commonly used is simply a large circular platform or wooden wheel, built about an upright shaft, the lower end of which turns in a socket. The wheel sets upon an incline, so that the horse, by walking constantly on one side, keeps it in motion. At the upper end of the shaft, gearing is arranged so as to give motion to the churns. Quite recently, a small engine in connexion with the heating arrangements for the cheese department has been used to supply power for driving the churns. The latest invention for supplying power for churning, consists in a system of gearing, driven by a heavy weight attached to a stout rope, which is wound about the cylinder of the machine. Sixteen feet of rope will turn the power half-an-hour, carrying the churn-dashers at the rate of fifty strokes to the minute, which is the rate of stroke best adapted for producing good butter in the dash-churn. It is adapted to any size of churn, and has a regulator to vary the dash without changing the weight.

METHOD OF MARKETING.

The butter factories usually have orders for butter as fast as it is made, so that the consignments are from week to week. In Orange County, the manner of marketing butter differs from that practised in other localities. Consignments are not generally made direct to the city dealers, but they are intrusted to "captains," as they are called, or persons who make it their business to collect freights of this kind, and take them in charge to New York, making the sales and returning the proceeds to the manufacturer. The captains go with their freight twice-a-week, are men of standing and responsibility, who are well acquainted with the trade, and know how and when to obtain the best prices. They receive a commission for their labours, and find it to their interest to make good sales; otherwise, they lose the confidence of those intrusting freight to their charge, and are liable, therefore, to be displaced. The captains often receive proposals for large lots of butter, which proposals are submitted to the factories, when they are accepted or rejected as seems best to the parties interested. They supply private families and hotels, and by having a line of customers who are willing to pay a high price for an extreme fancy article, very large returns are not unfrequently made to the factories. By this system the producer being brought near to the consumer, he must realize full prices for his goods, instead of feeding a class of middlemen, each one of whom will take his profit out of the product. With factories quite remote from the city, the product is either consigned to the wholesale dealer to be sold on commission, or the brand, having a reputation, is sold directly to city dealers, on contracts for weekly or semi-monthly deliveries.

The Naturalist.

*OCEAN LIFE.**

MEN are but children of a larger growth, and this is exemplified in their love of picture books. I defy any man to take up a book full of illustrations, and begin to read it ere he has glanced at the plates.

Feeling assured that no one will call this amiable weakness in question, or think the worse of any person retaining this feature of juvenility, I candidly confess that ere reading one word of "The Ocean World," I carefully examined the well-executed woodcuts with which this most interesting work is embellished. Who has not heard of the pathetic appeal made by a sailor to his mother—

> "Weep no more for me,
> For I am married to a mermaid
> At the bottom of the sea."

And really if the "Tar" happened to be a man of domestic habits, it is by no means unlikely that he might enjoy many comforts unknown to, and therefore unappreciated by, the denizens of this dry prosaic earth. The mermaid is doubtless the prototype of Dibdin's celebrated "Lass that loved a Sailor," and thus, not without reason, does this book propose to "delineate the inhabitants of ocean in their many metamorphoses, the cunning with which they attack or evade their enemies; their instructive industry; their quarrels, their combats, *and their loves.*" "A Life *on* the Ocean Wave" is all very well to those not subject to *mal de mer*, but "Life *in* the Ocean" is quite a different affair. There "the most wondrous enchantments are open to us, reminding us of the fairy tales of childhood's dreams." And on no insignificant arena are such scenes enacted, for the sea covers nearly two-thirds of the surface of the earth.

The First Chapter of the book is devoted to descriptions of various soundings taken to ascertain the depth of portions of the ocean; for, be it remembered, the sea is one and indivisible, although, for convenience sake, different names are given to parts. As one of the interesting results of such operations, the successful laying of the Atlantic cable may be mentioned.

The phosphorescence of the sea is very eloquently described and the causes thereof explained. "The phosphorescence of the sea is a spectacle at once impressing and magnificent. The ship, in plunging through the waves, seems to advance through a sea of red and blue flame, which is thrown off by the keel, like so much lightning. Myriads of creatures float and play on the surface of the waves, dividing, multiplying, and re-uniting, so as to form one vast field of fire. In stormy weather, the luminous waves roll and break in a silvery foam. Glittering bodies, which might be taken for fire-fishes, seem to pursue and catch each other, lose their hold, and dash after each other anew. From time immemorial the phosphorescence of the sea has been observed by navigators. The luminous appearance presents itself on the crest of the waves, which, in falling, scatters it in all directions. It attaches itself to the rudder, and dashes against the bow of the vessel, it plays round the reefs and rocks against which the waves beat, and on silent nights, in the tropics, the effects are truly magical. This phosphorescence is due chiefly to the presence of a multitude of mollusks and zoophytes which seem to shine by their own light; they emit a fluid so susceptible of expansion, that in the zig-zag movement pursued, they leave a luminous train upon the water, which spreads with immense rapidity."

The life size illustration of Ophiocoma Russer, which we give, is beautiful.

Then we read of the composition of the Salt Sea, and learn that if the quantity of sea salt contained in the water of the ocean were spread over the surface of the globe, it would form a layer of more than 30 feet in height. But this is nothing. A company was lately formed in America for the purpose of raising sunken treasure, while, if the members thereof only knew it, the old copper collecting round the keels of ships contains so much silver that it is worth extracting. It is said that in this way the ocean contains 2,000,000 tons of silver. Alas!

* "The Ocean World." By Louis Figuier. London and New York: Cassel, Petter, & Galpin.

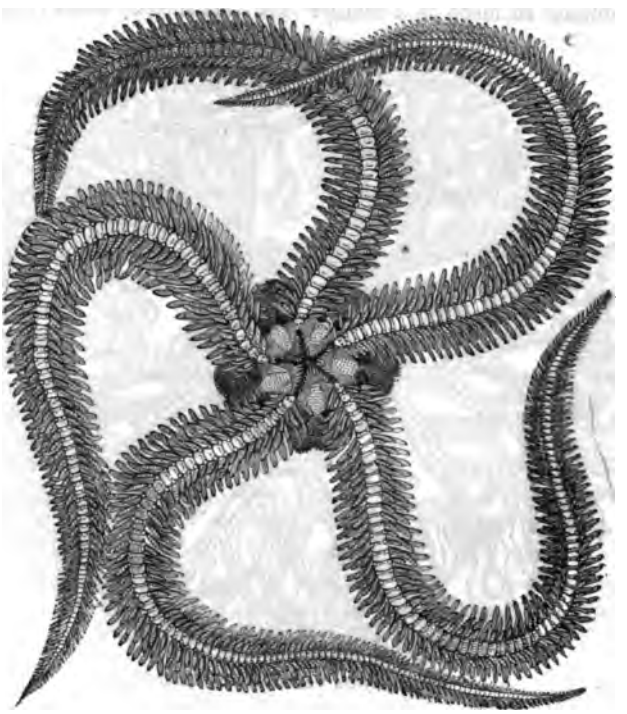
days of bubble companies are over, or how ly could a good *promoter* make the "Silver racting Company (un)-limited, *float*. (No e intended.)

eriously speaking, however, the simple ques- ı, Why is the sea salt, leads us to think of goodness and forethought of its and our at Creator. The saltness of the ocean is re- site for the maintenance of the meteorologi- and climatic changes which rule the deve- ment of life.

he Second Chapter treats of the Currents of an, Trade Winds, the Gulf Stream, or, as it is ed by Maury, "the river in the bosom of the

Chapter III. takes us from the surface to the profoundest depths of ocean—to "its plains and its mountains, its valleys, its precipices—all animated and embellished by innumerable organized beings."

To describe the wonders of the bottom of the sea would be impossible. During more than two thousand years research has been multiplied and succeeded by research without interruption; and yet, though much is known, how much is yet to know! It would be impossible by any means now existing to descend to the depths of ocean, but in many inland seas this is practicable, and a description is given of



Ophiocoma Russer (Lutken)—Natural Size.

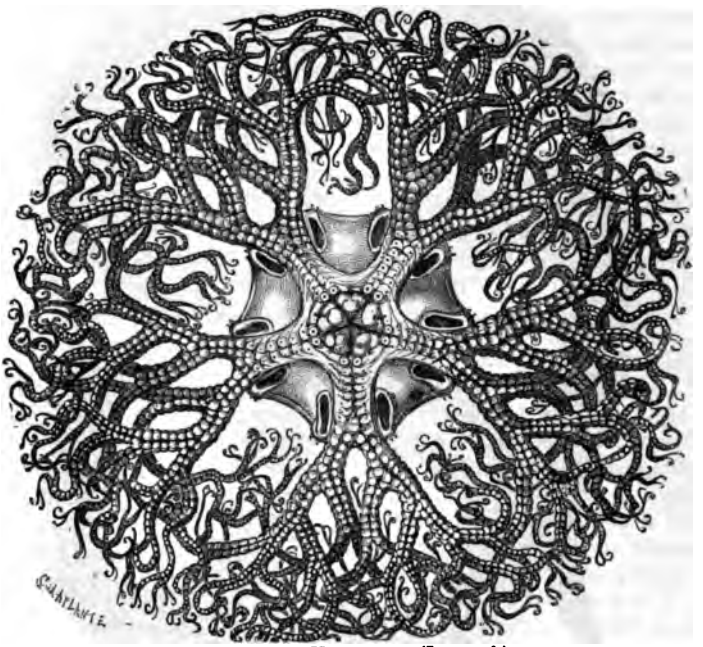
n," storms, tides, the Polar and Antarctic s. Of the voyages to the Northern and hern Poles, there is a short but cleverly ten account. Despite the vast sums ex- led in the many attempts to pass "these barriers," one cannot but hope that the time ot far distant when "Ocean will relax her upon the world," and the prediction of oet Seneca be fulfilled :—

"Venient annis
Sæcula seris quibus Oceanis
Vincula rerum laxet et ingens
Pateat tellus, tethysque novos
Detegat orbes, nec sit terris
Ultime Thule."

descents made by Mr Milne Edwards, to use an apparatus invented by Colonel Paulin, whereby he was enabled "to study in their most hidden and most inacessible retreats, the radiate animals, mollusks, crustaceans, and annilids, especially their larvæ and eggs, and by his descriptions to contribute most especially to make known the functions, manners, and mode of development of certain inhabitants of the sea, whose sojourn and habits would seem to sequestrate them for ever from our observation." On this point, it might be of interest to name that a short time since, M. Bazin, an officer in the French navy, invented, as aids to his scheme for

raising sunken vessels, a diving bell, in which the diver could use an electric light, and an instrument by which the botton of the sea could be photographed. This was requisite to shew the position of the sunken vessel. Such means could be adopted to bring up—shall I name them?—the landscapes of the sea. We would then behold the homes of the syrens of the deep; and what lessons might we not learn?

Even the Princess Louise, who is said to have drawn the design of her marriage veil, and very pretty it was, could not begin to *equal* (as the Americans say) such an exquisite picture as this, and which is but one "of these animated discs which resemble nothing so much as a delicate



Asterophyton Verrucosum (Lamarck).

piece of lace—a piece of living lace, moving in delicate festoons in the bosom of the ocean." The book is full of such beautiful illustrations—witness the cut of Asterophyton—nor are such confined to beauty alone, the useful objects of life are well represented and described. Dredging for oysters is also described; and here protest must be made as to certain accusations affecting the moral characters of oyster eaters. They are, and have been, called selfish, because no means are left untried by which to procure a supply of their favourite dish. Why, few people ever dream of eating more than a dozen now-a-days, and yet in a chapter, to peruse which makes one's mouth water, he reader is told of the feats of the oyster eaters of antiquity—Vitellus used to eat 1000 a-day—Seenca, whose prophecy respecting the Poles, has been alluded to here, "could eat his 100," and the great Cicero also loved his bivalve. No wonder the oyster beds have to be cared for now! Yet even for this, credit must be given to the Romans. Seiquis Orata invented an oyster pond. It is evident that the rapacious appetites of the antients must have caused more injury to this "key of that paradise, the appetite, the oyster," than even the dredging system in use now. From lobster, herring, and whale fishing, the reader gets to classic ground again among the eels. Who will not sympathize with the tears shed by noble Romans when their eels died, and revere the memory of Augustus who would not permit a slave to be thrown into a pond to be eaten by them? How unlike the lady in the Ingoldsby Legends, who insisted on her dear departed being thrown in again to catch some more. It would require much longer time than is granted to name all the matters interesting alike to scientific and general readers with which this book abounds. The youth will find in it stirring narratives of adventures on the deep, and thus raise that spirit of emulation for feats of daring which animate all young Britons; the scholar, an easy and familiarly written treatise, and all must rise from its perusal full of wonder and delight.

DUN-EDIN.

Hunting, Fishing, and Shooting.

*CARRICK SPORT.**

By "THE OLD SPORTSMAN."

THERE were now only three days remaining of the rod fishing on the Stynchar for 1870—though, happily, the river was still in flood.

A striking instance of the uncertainty of salmon flies occurred during our last, and indeed our only fortnight of good fishing for the season. A fly of the previous year (1869), called "death," from its many captures when all others failed, hardly even rose a fish to us, and certainly did not kill one. Our most successful lure, hitherto, has been described already, but it seemed to me possible to improve it by enlarging the hook, and substituting a wing from the common kite's tail. This feather has a brighter and more delicate lustre in clear water, and is better seen even when the river is large or turbid.

The kite is now so rare that few fishing-tackle shops can boast of having this tempting feather, and the makers fill its place generally from the Turkey, which makes an excellent, though not a better substitute, as they often allege. Many years ago, I was given a full tail of the kite by an old sporting friend, Peter Robertson, of the Black Mount, who always gave his best aids in my shooting and fishing expeditions. Times are changed since I can remember three kites' nests a mile from my father's Highland home, while these ornamental birds are now almost banished from the mountains of Scotland.

The river was too full and muddy till noon, so I had time to dress four flies, two rather large, and the other, a size less. We then set out for the afternoon and evening fishing, using all the time one of my own imitations, while my son chose a sterotyped Stynchar hook, making several changes when the fish refused to notice his lure. Two small salmon moved to my fly in the pool of Dub-a-nee, and two good ones in the Scaur, the last all but hooking, as I struck sharply and turned him on his side. During all this time my neighbour rod did not incite a single offer.

Showers in the night kept the river in the same trim as the previous day, so my son was given the chance of the gled's tail *versus* the Turkey cock's! We divided Dub-a-nee fairly, and had each cast over more than half of our water when my companion called out that he had risen a splendid salmon. Of course he passed down 10 yards without disturbing him further, and then fished blank to the end of the pool. Having failed to rise anything with showy colours, I chose the small sombre fly which had already done good service for my rod, while my comrade was to follow with the same hook which had started the fish. While making these arrangements, the river watcher walked past, but without waiting to see the result, as we meant to give the salmon a long rest.

After sitting about an hour on the bank, I went carefully over the high part of the pool, sweeping my fly above the huge fish with most attractive jerks. No notice, however, was taken of them, so the first temptation was again offered by my neighbour rod, in the shape of the gled's tail. There was no shyness this time, for with the greediness of a shark he seized the hook, and both of us were instantly opposite the struggling monster. With the exception of a spirited rush at intervals, ending always in a dangerous shake or savage vault, the play was fair and even.

* Continued from page 382.

Striking first up, and then across the stream, this strong and active salmon allowed himself to be turned whenever we approached difficult water, and began soon to hoist "signals of distress."

The angler had twice brought his victim within reach of Sandy's extended gaff, which he had hardly evaded by a languid sweep of the tail, when the watcher again hove in sight at "double quick" time, having caught a glimpse of the fight from a neighbouring knoll. However, he barely got "in at the death," for the fish made one more feeble effort to keep under water, and then floated to the bank, an unresisting mark for Sandy's "clip." His weight was 23 lb., and the time taken from hooking till landing was three-quarters of an hour.

It was now the 31st of October, the last day of the season, and every angler with either right or leave to fish on any part of the river, was of course at his post. The water was low, but as the ground had been well saturated with the previous rains, there was hope of its keeping in fishing trim till the evening.

My eldest son had made an effort, by travelling all night, to have one day on the Stynchar, but by every exertion he only arrived in time for luncheon, his portmanteau and fishing gear following. He had, however, carried his salmon rod himself, so after choosing one of my large reels, he joined us about two o'clock at the "Duccat Wheel," our nearest pool. "Dub-a-nee" had been unsuccessfully fished after breakfast, so we advised him not to try again till four o'clock in the afternoon, when it would be free from sunshine.

Early in the day, my second son had risen a large fish close under the bridge, and another about the same size moved to my rod in the "scaur." Each of them were tempted by the "gled's tail," and both were touched. The "Bridge Wheel" fisherman had, however, broken his hook by contact with the stones, so, as the salmon could not have been pricked with the blunted weapon, he was booked for an evening trial. The right of the top part of this wheel *below* the bridge falls to my share, and the lower half to a neighbouring farmer, but the fish rose exactly on our march. On the crest of the bridge were some officious onlookers, who ran at once to apprise the farmer of a feeding fish, when he hastened down with his rod, hooked, and lost the salmon by too great confidence in double gut and rough usage. So our only hope, faint though it was, rested in Dub-a-nee after sunset.

The water was growing very low and clear, when my eldest son threw his first cast with the small Turkey wing, the least glaring fly in our collection. At the same confined swirl of the current, a dull wave under the hook gave token of the prize which lay below. A long rest followed; then a cast, light as thistle-down, allured the wary insect-watcher to repeat his effort, with the evident resolve to dally no longer with his prey. Immediately, a vindictive plunge revealed both his power and will to use it, by breaking free from so fragile a chain. To my dismay, I now saw that my son had chosen, by mistake, the lightest reel line in my possession, only intended for sea trout or grilse, in the clearest water of July! Its length, however, was 100 yards, and having perfect confidence in the skill of the fisherman, I resolved not to flurry him with a warning, but to wait in patience until the prize was either lost or won.

He neither dashed round the pool in terror, nor refused to move in sullen indifference, but with a degree of calm dignity steered along the opposite bank, giving fitfully a revengeful toss which made my heart flutter. Higher, higher, he rowed himself, till he arrived within a few yards of the overhanging trees. If he resolved to pass this barrier, I knew well the alternative was a broken line for the angler, or a jump to the shoulders in the rapid current. At this crisis, the fish was turned by wary coaxing, and brought cautiously down to the deep water where he had been hooked. A new danger was here threatened, for the eddy tree appeared provokingly near, and it was likely the huge fish might strike across the river, twisting the line around its branches.

Again he was foiled by the coolness of his tormentor, and the upstream march was resumed.

The shades of evening now deepened, and my hopes of a daylight capture were over. The sky was, however, cloudless; not a breath stirred the leaves, and, to our delight, the glorious red harvest moon rose "broad" over the brow of the Ayrshire hills. We shall have him yet if we wait till midnight, thought I, as villager after villager rushed down from Colmonel to see the game played out. Being the only one of the group who knew the slender bond which united the fisherman with his fish, I watched the struggle with greater anxiety than any present, not excepting the angler himself.

Hour after hour passed away, but "MacFarlane's lamp" was bright in the sky, shedding full light on the river for the working of the salmon. It was nearly ten o'clock at night before the noble fellow begun to shew symptoms of yielding. "Bring a lantern, Sandy, as he can never be gaffed by moonlight." Sandy was soon ready and eager with light and steel. The salmon, however, though nearly spent, refused to come within reach of his weapon, and kept lashing the water into foam on the opposite shore. Quick as thought, Sandy dashed across the black stream and reached the fish before he sank. Then poising the lantern for a second, up to his waist in the water, he struck his victim with deadly determination---a pause ensued—the light hissed in the river, and was extinguished. Then followed a severe unseen struggle under the darkened bank, when Sandy, plucky fellow that he was, with a grip like a bull-dog, dripping from head to foot, crawled from the deep, shouting, "I ha'e him noo!"

The confident predictions that he was body-hooked, hazarded by the spectators on account of his strong play, were soon falsified, for he was found to be beautifully fixed by the tongue. His weight was nearly 25 lb., proving the finest fish of the season landed by the rod on the Stynchar. Thus to find he was right, was a triumph to the river watcher, who had always firmly maintained that my previous monster had been hooked by the mouth.

The latter, and another of much smaller size, were all which were lost to our rods, after being hooked, during the season.

Reports reached us every fishing day, however, both up and down the river, of fish breaking their hold and escaping. Considering the practice of many of the fishermen, it did not surprise me to hear of such mishaps. They make use of double or even triple gut, rugging the salmon after the manner of a schoolboy hauling in perch.

SHOOTING DOGS.

Only little inferior to the far-away mountain ranges, where deer, grouse, and ptarmigan reign supreme, a great deal of the most enjoyable sporting ground in Carrick is what is called "rough" and "mixed" shooting. The spoil of such a day may include grouse, blackgame, woodcock, snipe and roe, besides the lowland additions of pheasants, partridge, hares and rabbits. A large share of this ground, rightly termed "rough," consists generally of thick furze, knolls of broom, ferny brakes, and rushy dingles. For covers of this sort, pointers or setters are far inferior to thoroughly broken Clumba, or other spaniels, and as the arable fields, where the powers of the former are called into play, only appear at long and irregular intervals, it is best to discard them altogether.

The spaniel race is not difficult to train if special attention is given *at the first*, to keep them from hunting out of bounds. The whip and dog-call will soon force close-hunting into a habit, if the fault of wide-ranging is never overlooked through carelessness or indolence. After a dog learns the lesson that the prey is to fall to his master's gun, and not to be pounced on by himself, unless he is very stupid and worthless, he will be as anxious as the sportsman to gain fair shots, and retrieve the fallen game, whatever may be the nature of the ground.

I knew three Scotch terriers as good at this work as spaniels. They never sprung game out of shot, had excellent noses, and

such soft mouths that they always brought what was wounded alive to their master—who held terriers in higher estimation than other covert dogs. There is no doubt, however, that their nature is to hunt wider and slower, to be more eager after footed game, and not to search every tuft and bush with the energy and perseverance of cockers or spaniels.

It is a good rule to avoid hunting pointers or setters along with small dogs, as they tempt the latter to extend their range. I have also found that large retrievers, though thoroughly trained not to "break shot," are more likely to make pointers or setters unruly at grouse or partridge than those of smaller size, as they are so much more observable in their efforts to find the dead or wounded.

Some sportsmen may say that they never allow their retriever to try for fallen game until their setters or pointers have failed to have it secured. It appears to me such usage might go far to discourage and slacken the mettle of any valuable retriever.

During the long course of my shooting experience, only two retrievers have belonged to me which I considered A-1; notices of their sporting feats have been given in my published works, but a few words about their tempers and dispositions may be useful to those looking out for such valuable aids to the gun. The first and most perfect of these two dogs was sulky and unsociable. He would acknowledge no master but me, refusing to obey any one else, but all the energy of his rugged nature was used in my behalf with an unwearied devotion which no exactions could tire. As a shrewd gamekeeper observed, he was indeed "a faithfu', faithfu' beast!"

His rough surly face comes before me now, looking up beseechingly for orders when wild fowl were on the shore, ready to fulfil them to his last breath. On more than one occasion, after a tremendous swim for crippled ducks, he fell down on reaching land with his prey in his mouth, which only death would have forced him to part with to any one but his master.

Twice I was obliged to pay a surgeon's bill, besides compensation, for his savage attack on beggars, and no "collie" dare face him within reach of our home. Yet this dog on the hearthrug, amongst my little children, was as gentle as a lamb, allowing them to pinch his ears and tread on his toes without even indulging in a stiffled growl. His disposition was the more remarkable in contrast with a small cocker, which, though a great coward to grown-up people, resented any such liberties from children by a ready snap. The retriever was always considered the best guard possible for the little band, while the cocker, instead of defending them from enemies, might very likely have bitten them himself on slight provocation.

My other retriever was very different from his predecessor, both in temper and appearance. He was not unlike a St John's Newfoundland dog, though cast in a coarser mould and with a rougher coat. His nature was kindly, yet he was capable of great resolution in his sporting work. Although inferior to the other as a water dog, and not his equal on land at smaller game, for deer and roe he could not be excelled. With the most perfect promptness he obeyed every order, but had no reflexion to anticipate his master's instructions like his smaller rival. Indeed, I never met with a dog possessed of this quality, almost amounting to reason, but himself. The cause might be that the good-natured, amiable dog studied to please *many* masters, while he who was of a morose disposition concentrated all his powers to find out the wishes of *one*.

The sire of the large retriever I bought for a high price, having the reputation of being a perfect dog. He had, however, been spoilt in breaking, being too rash and hasty, though he had a keen nose and good will to use it. His mother, belonging to one of my relations, was a most valuable retriever, her son inheriting all her good qualities, with others in addition.

Few lovers of shooting have been more careful than I to secure good heather and stubble dogs, but though sparing neither trouble nor money in their behalf, only three

belonged to me which I have con-
d first-rate, since able to handle a gun
:ffect. During all those years, dozens
:ellent pointers and setters have been
but some drawback always kept them
attaining the highest rank in the dog

o of my famous trio were pointers, and
:her a black and tan setter. The for-
vere chosen and reared from the litter,
the setter was bought when two years
r £12.
hough steady to point, back, and
to shot the first season, none of them
:d their rare excellence till the third,
ıuing to improve afterwards for some

The two pointers cost me more cafe
watchfulness than the setter, which had
nest and freest temper, combined with
:eatest docility, of any dog ever hunted
· my eye. The pointers, however, after
ourth year, when thoroughly "made,"
rather superior to the setter. One of
lived till his twelfth year, and strange
:h it may seem, ranged and found game
successfully than ever on his last open-
f the moors ! I will venture to affirm
ew sportsmen in the kingdom can say
uch for so aged and hard worked a

dog of the first-class should be equally
at all game on hill or dale. His habit
d be hunting for birds by wind, but a
or rabbit on its form coming in its way,
xquisitely keen nose should be able to
:ive the scent at once, and point them
:adily as birds. He will never poke his
on the ground for fur, even if a bagful
)ted game fall to his master's gun, and
wn finding. Instead of his pace being
r very fast or very slow, it will not
ge from a determined canter, which
er time nor hard labour can subdue.
/ill instantly see and obey the slightest
l of hand or voice, and when hunting
a comrade, he will not feel jealousy. If
e-handed he will be ready to do his own
, besides that of another. Lastly, his
itution must be perfect, his feet sound,
ıfter the hardest day's work he ought to
be able to eat his supper with eager appetite
Such a character is the truthful description
of the three paragons to which I have referred.

My numerous valuable second-class dogs
would by many have been placed in the first
rank. Not a few failed from temper. Some
were excellent on heather, but never shewed
the same zest for turnip, potato, or stubble
fields. Others, though capital for lowland
work, were apt to slacken their metal on
the hills, and steady as they were at grouse,
never shewed the same aptitude for find-
ing them as in scenting pheasants or par-
tridges.

Many good sportsmen, I know, object to
hunt Highland and Lowland game with the
same dogs, and in most instances it may be
best to keep to this plan. Indeed, my own
experience seems to confirm it, when owning,
after so many years, that only three dogs
equally good at *all kinds of game* have fallen
to my lot, and that many a valuable dog may
not reach the first rank, by deteriorating when
his ground and game are changed.

For instance, a grouse dog taken to ground
where rabbits are plentiful, after a few are
rolled over to his point, may begin to track fur
by lowering his crest and getting careless of
winged game. In another case, if transported
to soft ground amongst snipe, his ardour will
be cooled on account of the many points
gained with little trouble.

Such temptations made no impression on
my three favourites, which could be hunted
anywhere and on all game, without the least
fear of detracting from their high qualities.

"Few dogs, but good," has always been my
motto on the subject, and none of inferior
grade have ever cumbered my kennel, so the
celebrated five described in this paper have
a right to be called "second to none." To
rank with them will be a rare attainment for
any of my future ranging dogs or retrievers.

In the next and concluding article I intend
giving a short notice of our Carrick Sport
with the gun.

MIXED SHOOTING.

The romantic heather-brae in front of the
windows of our house, in favourable seaso ,
sometimes rears a pack or two of red gro

None appeared last year, but we had no reason to complain, having been duly warned that there were no grouse on the Kirkhill shootings, although a few black game bred occasionally on the waste land of Tigue, about 3 miles distant, in a beautiful glen. A good carriage road to Glen Tigue, passing through pastoral valleys, leads to the overseer's house, where the horse and dog-cart are always lodged; then comes a lonely sheep-track for more than a mile, with silvery glimpses of the far sea, ending in rugged moorland, and bounded on both sides by the Tigue coverts.

The opening day for black-game was perfect for shooting. There shone a bright sun, with a warm breeze blowing, yet the weather was not too hot. The light clouds, floating in the sky, threw their shadows fitfully on the rich brown sides of the hills, which were fringed with fern, a shady retreat where the mother grey-hen often hides her poults.

With a couple of very steady pointers, my companion and I searched all these sheltering haunts of black-grouse, but did not touch on the scent of a single pack all day. In the open ground, however, we were more successful with his red cousin, and by careful shooting and ranging, bagged three brace and-a-half of fine birds, fifteen rabbits, and a hare, the only one we moved. On the drive home, I remarked to our watcher, Sandy, that the absence of black-grouse had been atoned for by the red ones, but that it was needless ceremony to have waited *for them* longer than the 12th of August. "Aye, sir," he answered, "but had ye gane on the twal' ye wadna hae found them, for they were a' drivin in by the neebour shooters, after grouse shootin began." This brought to my remembrance how many of our shot birds were found singly or in pairs, and that only one pack had been risen on the ground all day.

The 1st of September brought fair sport with the partridges, of which twelve brace, with some good red hares and rabbits were bagged to a couple of guns. From six to eight brace was the average on the home grounds afterwards, but we had also two detached lowland farms which yielded their eight brace, and some ground game, to two guns, on *their* first day.

By the middle of September, grouse and black-game had begun to seek the lower hills, and we generally added to the list a brace or two of tetroans on most shooting days. From the beginning of October till the end of November (when covert shooting is good and practicable), we had fine mixed bags of grouse, black-game, partridge, snipe, hares, and rabbits; while a couple or two of pheasants from the whin or fern surrounding the stubble fields, often graced our evening heap of the slain, besides an occasional curlew or moor plover.

When comparing notes with a young friend, he amused us with the account of a recent beat through a neighbour's preserves. The lady proprietor had been annoyed by pheasants spoiling the flowers in her garden, and in consequence invited a reputed dead shot to thin the ranks of the enemy. A constant fusilade continued all day, after which the conqueror returned, flushed with victory. "How many birds have you bagged, then?" asked the owner of the ground. "Oh, I did not *kill any* birds, but I sent out a great many feathers!" was the characteristic reply.

The rabbitter of Tigue told us that six roe-deer have haunted the wood all summer, and since the fall of the leaf, they are often seen. He offered to shew the passes, and to give his help in driving the coverts. Our informant, Cummins, is a strange looking little man, slow and sententious in his words, and with a touch of the mole-catcher fraternity in his composition. He was reared in Tigue, and never fails reverently to call attention to the ruined hut where he and his brothers were born. "It maks me eerie noo, sir, to pass the auld biggin after the gloamin, when I think on them that's gane." As he now lives in Colmonell, he often gets a cast in our dog-cart from Tigue, when returning home after his day of rabbit snaring.

About the end of November our first roe drive was arranged. A small thick larch-copse, with an undergrowth of rank heather, was first tried, by the advice of Cummins

It was thoroughly searched by seven beaters, a very efficient Clumba spaniel named "Joe," kindly lent by a friend, and a mute bull terrier of two seasons' covert practice. My three sons were at home for their holidays, so in all we mustered four trusty guns. "Mind the fox, sir," whispered Cummins, "he'll be here if he's in the hail wood." The wily one, however, was absent, and the drivers only flushed small game, of which we bagged a couple of cocks, three rabbits, a large jack hare, and a long eared owl. Three of these prettily marked birds flew solemnly over the head of the lowest gun, and one was shot for a hat to grace the head of a young Minerva.

After being stationed in the true roe passes, far ahead, by the little rabbit man, the hunt proper began about 12 o'clock. It was soon plain, however, that he had made a mistake in his tactics. The beaters were therefore stopped, and the drive changed, in order to take advantage of sun and wind. The shooters were placed according to my fancy this time, and in half-an-hour, a right and left from the middle gun, and a single shot from the lowest, proved that the deer had come courteously forward. Each gun had dropped its deer—an aged buck and doe —both in the finest condition for the table.

Last September in the newspaper game lists appeared the following notice:—"In —— Forest, Mr —— and Mr —— were successful in bringing down two excellent roe deer!" How they could be *excellent* at that time of year, would be hard to credit by any true sportsman. Other paragraphs of the same kind give roe venison the bad character bestowed on it by housekeepers and epicures, but if Mr —— and Mr —— had seen the two roes of our November hunt, they would not again *mis*-call theirs of September.

Two days afterwards, our second drive for the four remaining deer took place. The shooters were again stationed in the successful passes, but the beat was changed to suit the shifted wind. All went well, and in about an hour, two of the four roe stepped cautiously in front of the drivers. A large doe was making straight for my pass, about 100 yards off, when a very long flank right and left shot from our youngest sportsman, quickened and altered her course into a whin thicket. The shooter maintained she was hit, as she had never left the furze shelter, but his elder brother (the top gun) felt sure he saw her creep up the burn track and face the drive.

The firer of the ill-timed gun received a wholesome admonition, and the hunt was continued. No other deer appeared, so we loaded our guns with No. 6, and made a bag of woodcocks and rabbits. When beating the patch of whin for cocks, Sandy's quick eye descried the dead doe at the very spot in which the young shooter alleged she was hid, and it turned out to be her companion which was seen stealing away to the wood. This roe also proved in prime order for the board.

For my part, I thought we had killed enough of these pretty little deer, but the young sportsmen were eager for another trial of the Figue woods a few days later. The roes were now getting cautious, and separated on hearing the tap on the trees. Beaters should not be allowed to do more than strike the trees and bushes, *never* using their voices. Only one young buck was rash enough to come forward, and even he lost nerve on approaching the ambuscade. This yearling was the only roe seen by either beaters or shooters all day. How he evaporated was a mystery, as he certainly had not faced either drivers or guns, and yet had suddenly disappeared.

We afterwards made a good mixed bag of woodcock, pheasant, and rabbits, and were preparing in the twilight for the drive home, when it was suggested that the deer of the morning might possibly have crossed the Tigue burn for a comfortable retreat amongst the clump of broom on the opposite bank.

Two guns and the beaters, with "Joe" and the terrier, forded the river, while the remaining gun and I guarded the other side. The search in the broom was nearly ended before the game was roused. It sprang close to the feet of the young shooter, but dashing amidst the excited crew of beaters, he dared not fire until the creature in its confusion made a sharp turn, giving time only for a very quick snap. The difficulty of the chance was seen by all of us, but to

our satisfaction the buck rolled heels over head. Being so young it was only in average condition.

Although not "Carrick Sport," in case some of my readers may be interested in it, I may conclude with a short account of the last piece of sport which my eldest son enjoyed this season.

By the permission of a kind Perthshire friend (the proprietor), he went to Lude to try for a capercailzie, to complete the grouse family of our collection. The flight of this bird on first starting is somewhat peculiar, decidedly trying to the skill of a sportsman, as, resting hidden within a few feet of the top of the spruce firs, he usually descends like a cannon ball to within a short distance of the ground, and then having got way on, gradually rises to the height of the tops of the trees. As these spruce-firs are so close to each other, the shot is almost always a snap, confined to about 10 or 15 yards of open ground. The time to pick it, if possible, is when the bird steadies himself for the forward flight, after having made his downward swoop.

With a keeper on either hand, the black firwoods were ranged by sections, the crisp, shining snow, however, giving the birds early notice of the approach of the party. During two days, the woods were searched in vain, for although often seen, and once or twice within fair distance of one of the keepers, they always eluded the gun—the only shot obtained being a right and left at roe-deer on the second day, securing both. On the third, the sportsman was at last successful in dropping dead a magnificent cock with No. 4. Although very anxious for a mate, not another chance at either cock or hen could be obtained.

The month of May, dear to all anglers, is fast approaching. Rods and tackle are ready, and with favourable weather, interesting matter for the pen may be confidently expected.

The Country Gentlewoman.

LIVING IVY FOR PICTURE FRAMES.

IE cultivation of Ivy, both in and out of doors, has been frequently :ed to in our pages. It is one of the)est plants to have in the house, as it a large amount of neglect and abuse, ;ratefully repays good treatment. It

—Ivy trained round a Picture Frame or Mirror.

:. rare to see a pot of Ivy placed where ı be trained around picture frames or :s, and thus border them with living

ave hit upon a way of dispensing with)t, or rather I have a substitute for it, is kept out of sight. Figure 1 shews ure frame wreathed with Ivy after this d. Only a good-sized picture or mirror : treated in this way, and as such are ' hung so that the top of the frame leans forward, the space between the frame and the wall is available for the receptacle for the plant. A pot or pan of zinc, of a wedge shape, and of a size to suit the space between the frame and the wall, as shewn in fig. 2, can be readily made by any tinsmith. This is to be hung against the wall so as to be quite concealed by the picture, and the Ivy tastefully trained over the frame. A rustic frame is better suited to this purpose, as it not only affords better facilities for attaching the stems to the frame, but its style seems better adapted to this kind of decoration than more pretentious ones. Still, a gilt frame may be beautified in the same way. There is only one precaution to be used—viz., not to hang such a frame over a fireplace, for the combined heat and dust would soon destroy the plant. Let it hang so that it may face a north or east window. Don't forget the water; the pan holding the plant is out of sight, and therefore should be kept in mind. In summer, the pan containing the plants may be hung up on the shady side of the house, or the plants may be turned out in the open ground. Ivy, when planted out in the garden, if it is intended to repot it in autumn, should be kept tied up to a stake; if the branches are allowed to lie upon the ground, they will take root at nearly every joint. There is no plant easier to start from cuttings than Ivy, and none grows more readily if it has a good soil and does not suffer from dryness. One precaution must, however, be observed—viz., to provide proper drainage for the pot.—*Isabella T., Hampton Wick.*

Fig. 2.—Pot to hold the Ivy.

A CHEAP TRANSPARENCY.

NEW STYLE OF SIDE-LIGHTS FOR HALLS.

THE pretty transparency represented in the fig., is made by arranging pressed Ferns, Grasses, and autumn-leaves on a pane of window-glass which should be obscured, laying another transparent pane of the same size over it, and binding the edges with ribbon, leaving the group imprisoned between. Use gum-tragacanth in putting on the binding. It is well to secure a narrow strip of paper under the ribbon. The binding should be gummed all round the edge of the first pane, and dried before the leaves, ferns, &c., are arranged; then it can be neatly folded over the second pane without difficulty. To form the loop for hanging the transparency, paste a binding of galloon along the upper edge, leaving a 2-inch loop free in the centre, afterwards to be pulled through a little slit in the final binding. These transparencies may either be hung before a window, or, if preferred, secured against a pane in the sash. In country halls, a beautiful effect is produced by placing them against the side-lights of the hall-door. Where the side-lights are each of only a single pane, it is well worth while to place a single transparency against each, filling up the entire space, thus affording ample scope for a free arrangement of the Ferns, Grasses, and leaves, while the effect of the light passing through the rich autumnal colour is very fine. Leaves so arranged will preserve their beautiful appearance throughout the entire winter.—*Mary S., Bury St Edmunds.*

Transparency of Leaves, Ferns, &c.

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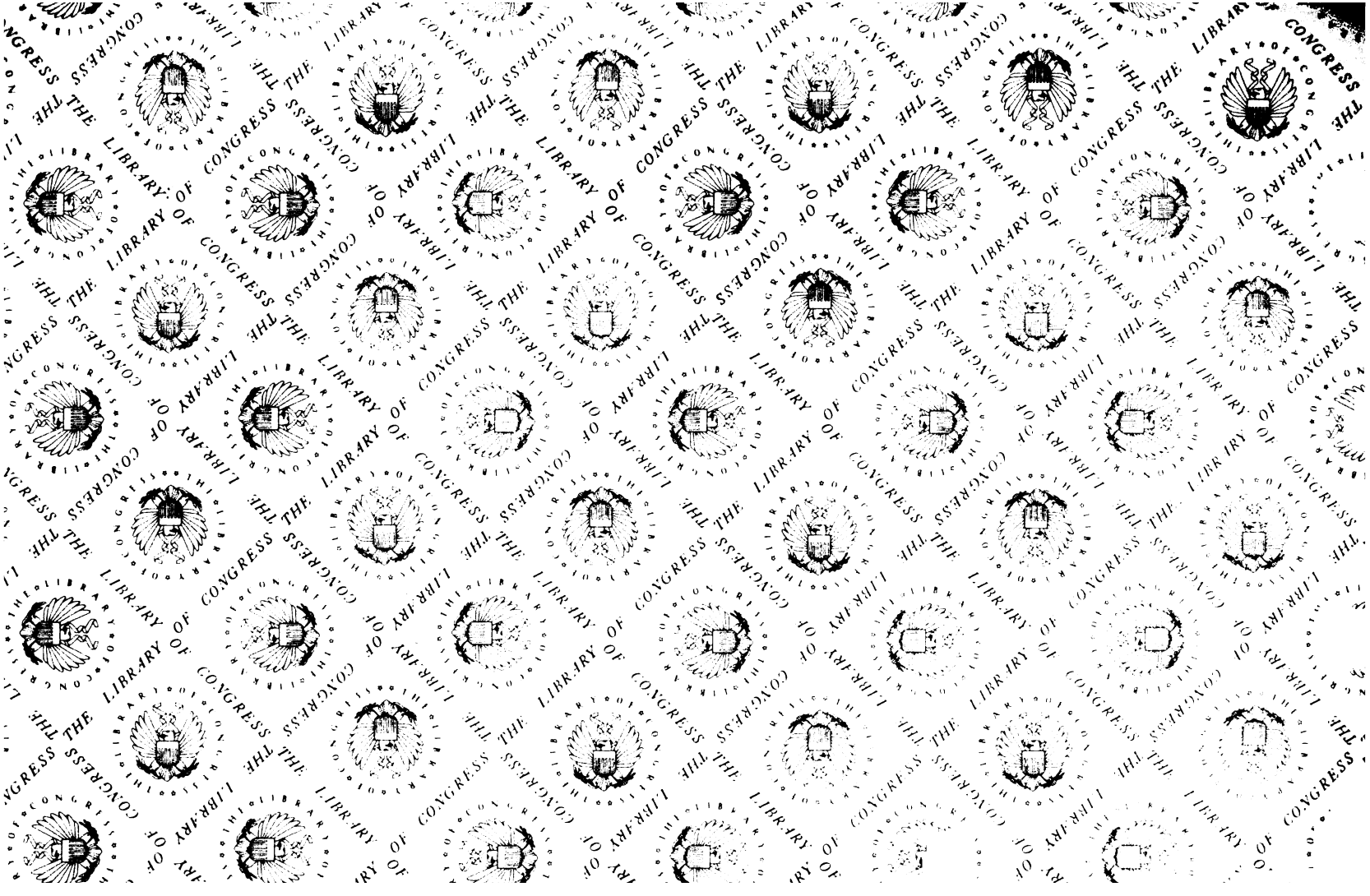
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